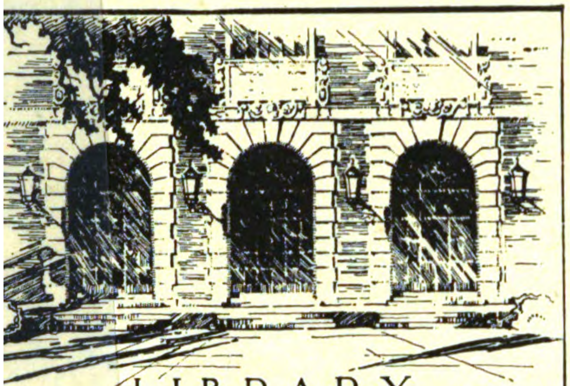
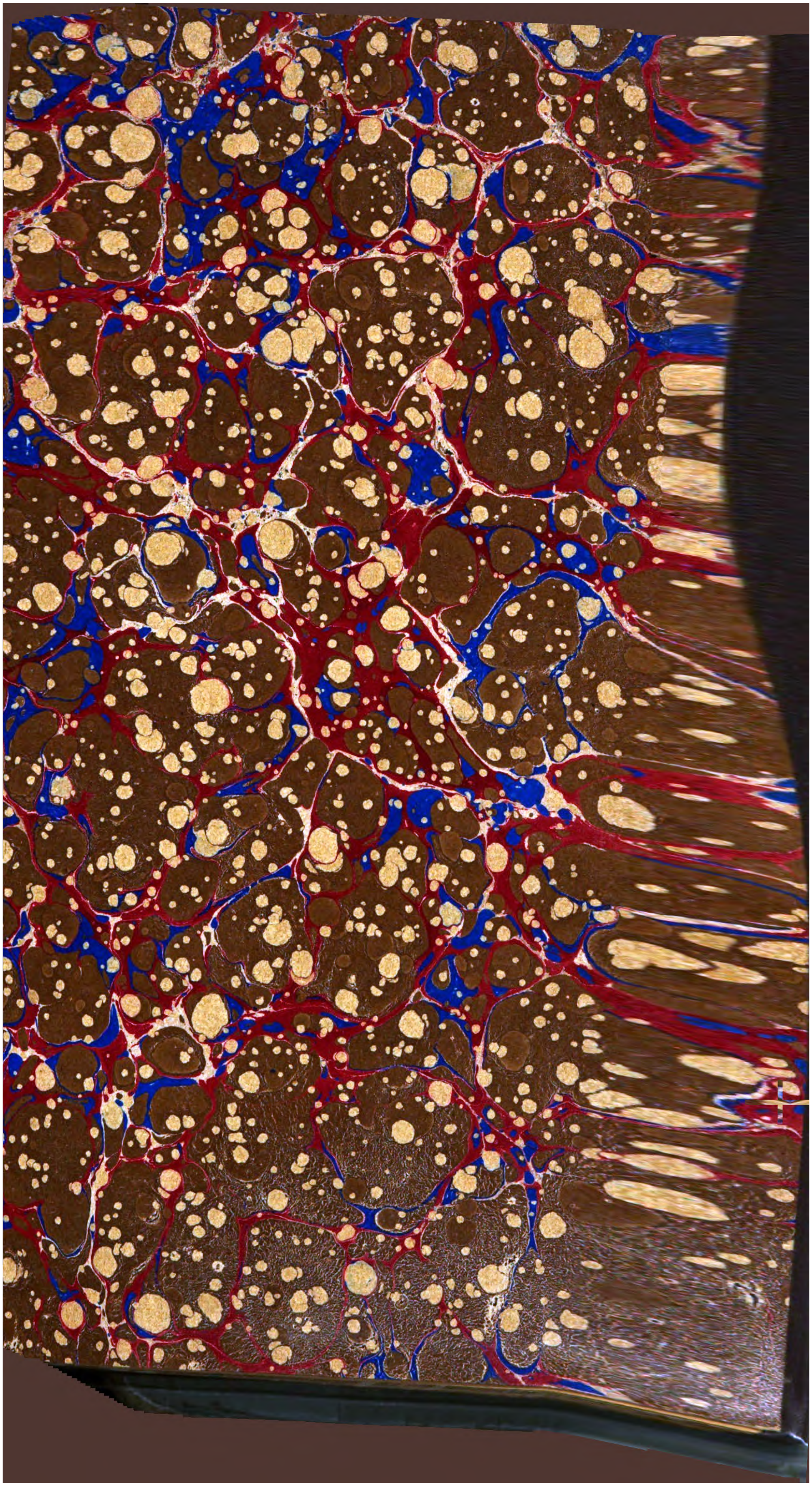


LIBRARY
OF THE
UNIVERSITY
OF ILLINOIS
031
Al22
v.19



ALDEN'S

MANIFOLD CYCLOPEDIA

OF

KNOWLEDGE AND LANGUAGE.

WITH ILLUSTRATIONS.

VOL. 19.

HOMAGE—INFANCY.

NEW YORK:
JOHN B. ALDEN, PUBLISHER.
1889.

Copyright, 1889,
BY
JOHN B. ALDEN.

031
Al22
v.19

SCHEME OF SOUND SYMBOLS

FOR THE PRONUNCIATION OF WORDS.

Note.—(-) is the mark dividing words respelt phonetically into syllables; (′), the accent indicating on which syllable or syllables the accent or stress of the voice is to be placed.

Sound-symbols employed in Respelling.	Representing the Sounds as exemplified in the Words.	Words respelt with Sound-symbols and Marks for Pronunciation.
ā	mate, fate, fail, aye	*māt, fāt, fāl, ā.*
ă	mat, fat	*măt, făt.*
â	far, calm, father	*fâr, kâm, fâ′thėr.*
ä	care, fair	*cär, fär.*
aw	fall, laud, law	*fawl, lawd, law.*
ē	mete, meat, feet, free	*mēt, mēt, fēt, frē.*
ĕ	met, bed	*mĕt, bĕd.*
ė	her, stir, heard, cur	*hėr, stėr, hėrd, kėr.*
ī	pine, ply, height	*pīn, plī, hīt.*
ĭ	pin, nymph, ability	*pĭn, nĭmf, ă-bĭl′ĭ-tĭ.*
ō	note, toll, soul	*nōt, tōl, sōl.*
ŏ	not, plot	*nŏt, plŏt.*
ô	move, smooth	*môv, smôth.*
ö	Goethe (similar to *e* in her)	*gö′tėh.*
ow	noun, bough, cow	*nown, bow, kow.*
oy	boy, boil	*boy, boyl.*
ū	pure, dew, few	*pūr, dū, fū.*
ŭ	bud, come, tough	*bŭd, kŭm, tŭf.*
û	full, push, good	*fûl, pûsh, gûd.*
ü	French plume, Scotch guid	*plüm, güd.*
ch	chair, match	*chär, măch.*
ċh	German buch, Heidelberg, Scotch loch (guttural)	*bôċh, hī′dėl-bĕrċh, lŏċh.*
g	game, go, gun	*gām, gō, gŭn.*
j	judge, gem, gin	*jŭj, jĕm, jĭn.*
k	king, cat, cot, cut	*kĭng, kăt, kŏt, kŭt.*
s	sit, scene, cell, city, cypress	*sĭt, sēn, sĕl, sĭt′ĭ, sī′prĕs.*
sh	shun, ambition	*shŭn, ăm-bĭsh′ŭn.*
th	thing, breath	*thĭng, brĕth.*
th	though, breathe	*thō, brēth.*
z	zeal, maze. muse	*zēl, māz, mūz.*
zh	azure, vision	*ăzh′ėr, vĭzh′ŭn.*

ABBREVIATIONS USED IN THIS WORK.

a., *or* adj	adjective.
A. B	Bachelor of Arts.
abbr	abbreviation, abbreviated.
abl	ablative.
Abp	Archbishop.
abt	about.
Acad	Academy.
acc	accusative.
act	active.
A. D	in the year of our Lord.
ad. *or* adv	adverb.
aft	after.
Adjt	Adjutant.
Adm	Admiral.
Ag	Silver (Argentum).
agri	agriculture.
Al	Aluminium.
Ala	Alabama.
alg	algebra.
A. M	before noon.
A. M	Master of Arts.
Am	Amos.
Amer	America, American.
anat	anatomy, anatomical.
anc	ancient, anciently.
An. M	in the year of the world.
anon	anonymous.
antiq	antiquity, antiquities.
aor	aorist, aoristic.
Apr	April.
Ar	Arabic.
arch	architecture.
archæol	archæology.
arith	arithmetic.
Ark	Arkansas.
art	article.
artil	artillery.
AS. *or* A. Sax.	Anglo-Saxon.
As	Arsenic.
Assoc	Association.
asst	assistant.
astrol	astrology.
astron	astronomy.
attor	attorney.
at. wt	atomic weight.
Au	Gold (Aurum).
A. U. C	in the year from the building of Rome.
Aug	August.
aug	augmentative.
Aust	Austrian.
A. V	authorized version (of Bible), 1611.
avoird	avoirdupois.
B	Boron.
B	Britannic.
b	born.
Ba	Barium.
Bart	Baronet.
Bav	Bavarian dialect.
bl., bbl	barrel, barrels.
B. C	before Christ.
B. C. L	Bachelor of Civil Law.
B. D	Bachelor of Divinity.
bef	before.
Belg	Belgic.
Bi	Bismuth.
biog	biography, biographical.
biol	biology.
B. L	Bachelor of Laws.
Bohem	Bohemian.
bot	botany, botanical.
Bp	Bishop.
Br	Bromine.
Braz	Brazilian.
Brig	Brigadier.
Brit	British, Britannica.
bro	brother.
Bulg	Bulgarian.
bush	bushel, bushels.
C	Carbon.
c	century.
c	city.
Ca	Calcium.
Cal	California.
Camb	Cambridge.
Can	Canada.
Cant	Canterbury.
cap	capital.
Capt	Captain.
Card	Cardinal.
carp	carpentry.
Catal	Catalonian.
Cath	Catholic.
caus	causative.
cav	cavalry.
Cd	Cadmium.
Ce	Cerium.
Celt	Celtic.
Chal	Chaldee.
chem	chemistry, chemical
chh	church.
Chin	Chinese.
Chron	Chronicles.
chron	chronology.
Cl	Chlorine.
Class	Classical (= Greek and Latin).
Co	Cobalt.
Co	Company.
co	county.
cog	cognate, cognate with.

ABBREVIATIONS.

Col	Colonel.
Col	Colossians.
Coll.	College.
colloq.	colloquial.
Colo.	Colorado.
Com	Commodore.
com	commerce.
comp.,	compare.
compar.	comparative.
conch.	conchology.
cong.	congress.
Congl.	Congregational.
conj	conjunction.
Conn.	Connecticut.
contr.	contraction, contracted.
Cop	Coptic.
Cor	Corinthians.
corr.	corresponding.
Corn.	Cornish.
Cr	Chromium.
crystal	crystallography.
Cs	Cæsium.
ct	cent.
Cu	Copper (Cuprum).
cwt	a hundred weight.
Cyc	Cyclopædia.
Cym	Cymric.
D	Didymium.
D. *or* Dut	Dutch.
d	died.
d. (l. s. d.)	penny, pence.
Dak	Dakota.
Dan	Daniel.
Dan	Danish.
dat	dative.
dau.	daughter.
D. C	District of Columbia
D. C. L.	Doctor of Civil (or Common) Law.
D. D	Doctor of Divinity.
Dec.	December.
dec.	declension.
def	definite, definition.
deg	degree, degrees.
Del	Delaware.
Del.	Delegate, Delegates
Dem	Democratic.
Dep.	Deputy, Deputies.
dep	deponent.
dept	department.
deriv	derivation, derivative.
Deut.	Deuteronomy.
dial.	dialect, dialectic.
diam	diameter.
Dic	Dictionary.
dim	diminutive.
dist	district.
distrib	distributive.
div	division.
doz.	dozen.
Dr.	Doctor.
dr.	dram, drams.
dram	drama, dramatic.
dwt	pennyweight.
dyn	dynamics.
E.	Erbium.
e	east, eastern.
E., Eng.	English.
Eccl.	Ecclesiastes.
eccles.	ecclesiastical.
ed	edited, edition, editor.
e.g.	for example.
Egypt	Egyptian.
elect	electricity.
Emp.	Emperor.
Encyc	Encyclopædia.
engin	engineering.
engr.	engraving.
entom	entomology.
env. ext.	envoy extraordinary.
ep	epistle.
Eph	Ephesians.
Epis	Episcopal.
eq	equal, equals.
equiv	equivalent.
Est.	Esther.
estab.	established.
etc	and others like.
Eth	Ethiopic.
ethn	ethnography, ethnology.
et seq.	and the following.
etym	etymology.
Eur	European.
Ex	Exodus.
exclam	exclamation.
Ezek	Ezekiel.
Ezr	Ezra.
F	Fluorine.
f	father.
Fahr	Fahrenheit.
Fe	Iron (Ferrum).
Feb	February.
fem	feminine.
fig	figure, figuratively.
Finn	Finnish.
Fl	Flemish.
Fla	Florida.
for	foreign.
fort	fortification.
Fr	French.
fr.	from.
freq	frequentative.
Fris	Frisian.
ft	foot, feet.
fut	future.
G	Glucinium.
Ga	Gallium.
Gael	Gaelic.
Gal	Galatians.
gal	gallon.
galv	galvanism, galvanic.
Gen	General.
Gen	Genesis.
gen. *or* genit	genitive.
Geo	Georgia.
geog	geography.
geol	geology.
geom	geometry.
Ger	German.
Goth	Gothic.
Gov	Governor.
govt	government.
Gr	Grand.
Gr	Greek.
gr	grain, grains.
gram	grammar.
H	Hydrogen.
h	hour, hours.
Hab	Habakkuk.
Hag	Haggai.
H. B. M.	His (or Her) Britannic Majesty.

ABBREVIATIONS.

Heb	Hebrew, Hebrews.
her	heraldry.
Hg	Mercury, Hydrargyrum.
hhd	hogshead, hogsheads.
Hind	Hindostanee, Hindu, or Hindi.
hist	history, historical.
Hon	Honorable.
hort	horticulture.
Hos	Hosea.
Hung	Hungarian.
hydros	hydrostatics.
I	Iodine.
I., Is	Island, Islands.
i., *or* intran	intransitive.
Icel	Icelandic.
ich	ichthyology.
Ida	Idaho.
i.e	that is.
Ill	Illinois.
illus	illustration.
Imp	Imperial.
imper	imperative.
imperf	imperfect.
impers	impersonal.
In	Indium.
in	inch, inches.
incept	inceptive.
Ind	Indiana.
ind	indicative.
indef	indefinite.
Indo-Eur	Indo-European.
inf	infantry.
inf	infinitive.
int	interest.
intens	intensive.
interj	interjection.
introd	introduction.
Io	Iowa.
Ir	Iridium.
Ir	Irish.
Iran	Iranian.
irr	irregular.
Is	Isaiah.
It	Italian.
Jan	January.
Jas	James.
Jer	Jeremiah.
Jn	John.
Josh	Joshua.
Jr	Junior.
Judg	Judges.
Jul	July.
K	Potassium (Kalium)
K	Kings (in Bible).
k	king.
Kan	Kansas.
Kt	Knight.
Ky	Kentucky.
L	Latin.
L	Lithium.
l. (l. s. d.)	pound, pounds (sterling).
La	Lanthanium.
La	Louisiana.
Lam	Lamentations.
lang	language.
lat	latitude.
lb., llb	pound, pounds (weight).
Lett	Lettish.
Lev	Leviticus.
L. G.	Low German.
Lieut	Lieutenant.
Linn	Linnæus, Linnæn.
lit	literal, literally.
Lith	Lithuanian.
L. L.	Late Latin, Low Latin.
LL.D	Doctor of Laws.
lon	longitude.
M	Monsieur.
m	mile, miles.
M. A	Master of Arts.
Macc	Maccabees.
mach	machinery.
Mag	Magazine.
Maj	Major.
Mal	Malachi.
manuf	manufactures.
Mar	March.
masc	masculine.
Mass	Massachusetts.
math	mathematics, mathematical.
Matt	Matthew.
M. D	Doctor of Medicine.
Md	Maryland.
Me	Maine.
mech	mechanics, mechanical.
med	medicine, medical.
Med. L.	Mediæval Latin.
mem	member.
mensur	mensuration.
Messrs. *or* MM	Gentlemen, Sirs.
metal	metallurgy.
metaph	metaphysics, metaphysical.
meteor	meteorology.
Meth	Methodist.
Mex	Mexican.
Mg	Magnesium.
M. H. G.	Middle High German.
Mic	Micah.
Mich	Michigan.
mid	middle (voice).
milit	military.
min	minute, minutes.
mineral	mineralogy.
Minn	Minnesota.
Min. Plen	Minister Plenipotentiary.
Miss	Mississippi.
Mlle	Mademoiselle.
Mme	Madam.
Mn	Manganese.
Mo	Missouri.
Mo	Molybdenum.
mod	modern.
Mont	Montana.
Mr	Master (Mister).
Mrs	Mistress (Missis).
MS., MSS	Manuscript, Manuscripts.
Mt	Mount, mountain.
mus	music.
Mus. Doc	Doctor of Music.
myth	mythology, mythological.
N	Nitrogen.
N	Norse, Norwegian.
n	north, northern, northward.

ABBREVIATIONS.

n	noun.
Na	Sodium (Natrium).
Nah	Nahum.
nat	natural.
naut	nautical.
navig	navigation.
Nb	Niobium.
N. Car	North Carolina.
Neb	Nebraska.
neg	negative.
Neh	Nehemiah.
neut	neuter.
Nev	Nevada.
N. Ham	New Hampshire.
N. H. G	New High German.
Ni	Nickel.
N. Jer	New Jersey.
N. Mex	New Mexico.
N. T., *or* N. Test	New Testament.
N. Y.	New York.
nom	nominative.
Norm	Norman.
North. E	Northern English.
Nov	November.
Num	Numbers.
numis	numismatics.
O	Ohio.
O	Oxygen.
Obad	Obadiah.
obj	objective.
obs., *or* †	obsolete.
obsoles	obsolescent.
O. Bulg	Old Bulgarian.
Oct	October.
OE	Old English.
OF. *or* O. Fr.	Old French.
O. H. G	Old High German.
Ont	Ontario.
O. Prus	Old Prussian.
Or	Oregon.
ord	ordnance.
orig	original.
ornith	ornithology.
Os	Osmium.
O. Sax	Old Saxon.
O. T., *or* O. Test	Old Testament.
Oxf	Oxford.
oz	ounce, ounces.
P	Phosphorus.
p., pp	page, pages.
p., *or* part	participle.
paleon	paleontology.
parl	parliament.
pass	passive.
pathol	pathology.
Pb	Lead (Plumbum).
Pd	Palladium.
pejor	pejorative.
Penn	Pennsylvania.
Per	Persic or Persian.
perf	perfect.
pers	person.
persp	perspective.
Peruv	Peruvian.
Pet	Peter.
Pg	Portuguese.
phar	pharmacy.
Ph.D	Doctor of Philosophy.
Phil	Philippians.
Philem	Philemon.
philol	philology, philological.
philos.	philosophy, philosophical.
Phen	Phœnician.
photog	photography.
phren	phrenology.
phys	physical, physiology
physiol	physiology, physiological.
Pl.	Plate.
pl.	plural.
Pl. D	Platt Deutsch.
plupf	pluperfect.
P. M	after noon.
pneum	pneumatics.
P. O.	Post Office.
poet	poetical.
Pol	Polish.
pol. econ	political economy.
pop.	population.
poss.	possessive.
pp	pages.
pp	past participle.
p. pr	present participle.
Pr.	Provençal.
prep	preposition.
Presb	Presbyterian.
Pres.	President.
pres	present.
pret	preterite.
prim	primitive.
priv	privative.
prob	probably.
Prof	Professor.
pro	pronoun.
pron	pronunciation, pronounced.
pros.	prosody.
Prov	Proverbs.
prov	province, or provincial.
Ps	Psalm, Psalms.
psychol	psychology.
pt.	pint.
Pt	Platinum.
pub	published, publisher.
pwt	pennyweight.
Q	Quebec .
qt.	quart.
qtr.	quarter (28 lbs.).
qu	query.
R	Rhodium.
r., *or* riv	river.
Rb	Rubidium
q.v.	which see.
Rom. Cath	Roman Catholic.
rec. sec	recording secretary
Ref.	Reformed.
refl	reflex.
reg	regular.
rel. pro	relative pronoun.
rep	representation.
Rev.	Revelation.
Rev.	Reverend.
Rev. V	Revised Version.
rhet	rhetoric, rhetorical.
R. I.	Rhode Island.
Rom	Roman, Romans.
r.r.	railroad.
Rt	Right.
Ru	Ruthenium.
Rus.	Russian.

ABBREVIATIONS.

r.w.	railway.
S	Sulphur.
s.	second, seconds.
s.	shilling, shillings.
S. *or* s.	south, southern, southward.
Sam	Samuel.
Sax	Saxon.
Sb	Antimony (Stibium).
Sc	Scotch.
Scand	Scandinavian.
S. Car	South Carolina.
scr	scruple, scruples.
Scrip	Scripture, Scriptural.
sculp	sculpture.
Se	Selenium.
sec	secretary.
sec	section.
Sem	Semitic.
Sep	September.
Serv	Servian.
Si.	Silicon.
sing	singular.
sis	sister.
Skr	Sanskrit.
Slav	Slavonic, Slavic.
Sn	Tin (Stannum).
Soc	Society.
Song Sol	Song of Solomon.
Sp	Spanish.
sp. gr	specific gravity.
sq	square.
Sr	Senior.
Sr	Strontium.
St.	Saint.
st.	street.
stat.	statute.
S. T. D	Doctor of Sacred Theology.
subj	subjunctive.
suf	suffix.
superl	superlative.
Supp	Supplement.
Supt	Superintendent.
surg	surgery, surgical.
Surv	surveying.
Sw.	Swedish.
sym	symbol.
syn	synonym.
Syr	Syriac.
t	town.
tr	transitive.
Ta	Tantalum.
Tart	Tartar.
Te	Tellurium.
technol.	technology.
teleg	telegraphy.
Tenn	Tennessee.
terr.	territory.
term.	termination.
Teut	Teutonic.
Tex.	Texas.
Th	Thorium.
theol	theology, theological.
Thess.	Thessalonians.
Ti.	Titanium.
Tim.	Timothy.
Tit	Titus.
Tl.	Thallium.
toxicol	toxicology.
trigon	trigonometry.
Turk	Turkish.
typog.	typography, typographical.
U.	Uranium.
Unit	Unitarian.
Univ	Universalist.
Univ	University.
U. Presb.	United Presbyterian.
U. S.	United States.
Ut	Utah.
V	Vanadium.
v.	verb.
Va	Virginia.
var.	variety (of species).
Vt	Vermont.
v. i	verb intransitive.
vill	village.
viz.	namely.
v. n.	verb neuter.
voc	vocative.
vol	volume.
vols.	volunteers.
v. tr	verb transitive.
W	Tungsten (Wolfram).
W.	Welsh.
w	west, western, westward.
Wash	Washington.
Wis.	Wisconsin.
wt	weight.
W. Va	West Virginia.
Wyo	Wyoming.
Y	Yttrium.
yd	yard.
yr	year.
Zech	Zechariah.
Zeph	Zephaniah.
Zn.	Zinc.
zool.	zoology, zoological.
Zr	Zirconium.

ALDEN'S

MANIFOLD CYCLOPEDIA.

HOMAGE, n. *hŏm'āj* [F. *hommage*, homage, duty—from Prov. *homenatge*—from mid. L. *hominăticum*, feudal homage—from L. *homo*, a man]: in feudal times, the service or fealty promised by a knight or vassal to his lord or superior, as his lord's *man;* the act of giving the promise. The word is derived from the form of expression used in doing the service, which was—*jeo deveigne vostre home*—I become your man. Since the abolition of tenures, the word has no substantial legal meaning in the law of England, except in a limited sense as to copyholds, to denote the kind of acknowledgment made by a tenant to the lord of the manor. *Homagium reddere* was the expression, now obsolete, signifying a solemn renunciation of homage or fealty to the lord, and a defiance of him. The word denotes also in general, respect paid by outward action; reverential worship; devout affection; recognition of superiority.—Syn.: fealty court; submission; reverence; honor; respect; regard; deference; obeisance.

HOMALONOTUS, n. *hŏm'ă-lŏ-nō'tŭs* [Gr. *homălos*, on the same level; *nōtos*, the back]: in *geol.*, a genus of trilobites.

HOMALOPSIDÆ: family of colubrine serpents, of the group *Suspecta ;* comprising several genera, of which some are N. American; characterized by flat spaces on the head and abdomen. They inhabit the rivers of southern Asia.

HOMALOPTERA, *hŏm-a-lŏp'tėr-a* [Gr. level-winged]: name given by some entomologists to a small order of insects, more generally regarded as a division of the order *Diptera*. The H. have been called also PUPIPARA, from the remarkable circumstance that the larvæ are hatched within the body of the mother, and remain there till they have passed into the pupa state. Some of the H. are wingless. Examples of this order are found in the forest fly (q.v.), and in those extraordinary parasites of bats called *Nycteribia*. All the H. are parasites.

HOMBRE, n. *hŏm'bėr:* another spelling of OMBRE, which see.

HOMBURG-VOR-DER-HOHE, *hŏm'bûrg-vor-dĕr-hŏ'ĕh:* pleasant little town in the province of Hesse-Nassau, Germany, at the foot of the Taunus Mountains, nine m. n.w. of Frankfurt-on-the-Maine. It has beautiful environs, and is much frequented for its mineral waters and, until recently, its gambling-saloons. The waters are considered very effective in cases of disordered liver and stomach. They are five in number, and one of them, the *Elizabeth*, contains more carbonic acid than any saline spa known. About 400,000 bottles of the 'waters' of H. are annually sent away. Pop. (1871) 8,626; (1880) 8,336.

HOME, n. *hōm* [AS. *ham;* Goth. *haims;* F. *hameau*, a village, a dwelling: Icel. *heimr*, an abode; *heima*, home]: a dwelling-house; an abode; one's own country: ADJ. domestic; produced at home or in one's own country; close or severe, as a home-thrust: AD. to one's own habitation or country; close to our own breast or affairs; to the utmost; fully; closely: *home* is used of anything close in its place—applied to the sheets of the sails, to the shot in a gun, etc. HOME'LY, a. *-lĭ*, plain; not handsome; not polished; easy and plain in manners: AD. in a homely manner. HOME'LINESS, n. *-nĕs*, want of beauty; plainness; want of polished manners. HOME'LESS, a. without a home. HOME'LESSNESS, n. state of being without a home. AT HOME, at one's own place of abode. AT HOME IN ANYTHING, conversant or familiar with. HOME-BORN, native; not foreign. HOME-BOUND, or HOMEWARD-BOUND, on the way to one's abode or native country, particularly by sea. HOME-BRED, native; plain; uncultivated. HOME-BREWED, brewed at home, as beer or ale. HOME FARM, the cultivated fields around a mansion-house and grounds—frequently kept in the proprietor's own hands. HOME-MADE, of domestic manufacture. HOME OFFICE, the department of government which has direct control over all matters relating to the internal affairs of Great Britain and Ireland. HOME SECRETARY, in *Britain*, one of the high officers of state to whom is intrusted the management of affairs connected with the civil jurisdiction of the kingdom. HOME'SICK, a. pining after one's native place or home. HOME'SICKNESS, n. HOME-SPUN, a. wrought at home; plain in manner or style; not elegant: N. a coarse, rude, untaught, person. HOMESTEAD, n. [*home*, and *stead*]: the ground on which a house stands, and the inclosed ground surrounding it. HOME'WARD, or HOME'WARDS, ad. in the direction of, or toward home. TO BRING A THING HOME, to prove guilty; to convict. TO COME HOME, to remember with sorrow; to recoil upon as a punishment; to convict. TO DRIVE A NAIL HOME, to advance a reason or argument which cannot be resisted.—SYN. of 'home': residence; house; dwelling; tenement; the seat; country;—of 'homespun': native; plain; coarse; rude; homely; inelegant.

HOME, *hōm*, DANIEL DOUGLAS: 1833, Mar. 20—1886, June 21; b. near Edinburgh, Scotland: spiritualist. He was brought to the United States 1840: became known as a spiritualistic medium 1850; resided several years in Lebanon, Conn., Springfield, Mass., and Newburg and Troy,

N. Y.; studied medicine in New York 1853; removed to London 1855, whence he made frequent visits to Russia, Germany, Italy, and France, and gave remarkable manifestations before the courts and most eminent people; was twice married to Russian ladies of rank and wealth; and published *Incidents of My Life*. The elder Dumas, Prof. William Crookes, and Victorien Sardou investigated his alleged phenomena and publicly pronounced them free from trickery; and Elizabeth Barrett Browning, Mary Howitt, and Mrs. Samuel C. Hall were among his intimates. Alexander II., Napoleon III., and Eugenie, and Queen Victoria were numbered among his reputed private patrons; yet many believed him a shrewd impostor.

HOME, *hōm*, HENRY (Lord KAMES): 1696–1782, Dec. 27; b. Kames, Berwickshire: eminent Scottish lawyer and author. Intended by his friends for the law, he was apprenticed 1712 to a writer to the signet; but he afterward decided on adopting the highest branch of his profession, and qualified himself for it mainly by private reading and attendance at the courts. Entering the bar 1723, he was raised to the bench 1752, Feb., assuming the title of Lord Kames, and was made one of the lords of justiciary 1763. He is best known, however, by *Essays on the Principles of Morality and Natural Religion* (1751), containing a solution of the question of human freedom, which brought on him the suspicion of infidelity, and raised considerable controversy in the courts of the church and through the press; his *Introduction to the Art of Thinking* (1761); and above all, his celebrated *Principles of Criticism*, the work on which his fame now chiefly rests. Though thus busily occupied with judicial and literary labors, he took active interest in agriculture and commerce. His last work *Loose Thoughts on Education* (1781), was written in his 85th year. See Lord Woodhouselee's *Memoirs of the Life and Writings of Home* (2 vols. 4to, Edin. 1807).

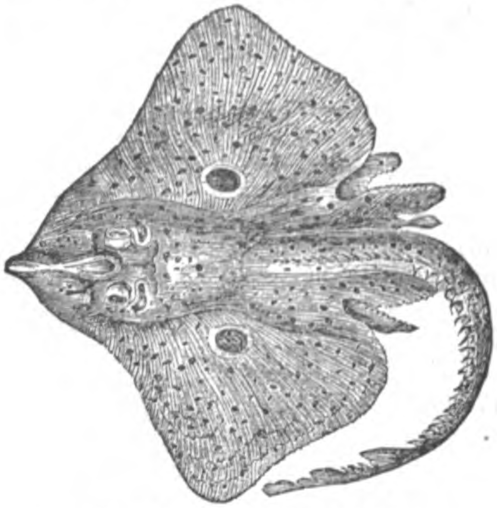
HOME, JOHN: 1722–1808: Scotch clergyman and dramatist. He studied for the Presb. ministry, and was appointed to the parish of Athelstaneford, where he wrote his tragedy of *Douglas*, which was acted in Edinburgh, and received with the utmost enthusiasm. The production of this piece gave great offense to his clerical brethren, and he was finally compelled to retire from the ministry. He retired into England, where he obtained the protection of the Earl of Bute, received a pension, and wrote other dramatic pieces, all forgotten long since. It is difficult now to understand the enthusiasm with which *Douglas* was greeted. It was praised by men of all ranks, and Burns—who should have known better—talks of H. having

> 'Methodized wild Shakspeare into plan.'

This enthusiasm has departed long ago.

HOMELYN, *hōm'lĭn* (*Raia miraletus* or *maculata*): species of Ray (q.v.), common on the s. coast of England, and plentiful in the London market. In form and appearance, it more nearly resembles the thornback than the skate.

On some parts of the British coast, the H. is called Sand Ray. It is known also as the Spotted Ray.



Homelyn (*Raia maculata*).

HOMER, n. *hō'mėr* [Heb. *hkomer*, a mound, a heap]: a Hebrew measure containing about 75 gallons 5 pints liquid measure, or 8 bush. dry measure; also **Chomer**, n. *kō'mėr*, and **Cor**, n. *kōr*.

HOMER, n. *hŏm'ėr:* a pigeon trained to fly home from distant places.

HOMER, *hō'mėr:* village in H. tp., Cortland co., N. Y.: on the Syracuse Binghamton and New York railroad; 3 m. n. of Cortland, 27 m. s. of Syracuse. It is in a fertile valley on the Tioghnioga river, contains 6 churches, 2 national banks (cap. $175,000), acad. and graded school, and has large flour mills, blast furnace, and axe, tub, pail, and wagon factories. Pop. (1870) 2,008; (1880) 2,331.

HOMER, *hō'mėr:* greatest name in the history of epic poetry, as eminent in that department as the name of Shakespeare in the drama; in modern times unfortunately little better than a name, presenting materials for biography as scanty as the materials for criticism are rich. We are not, however, forced to go to such lengths of doubt in his case as Aristotle did in the case of Orpheus, denying that such a man ever existed; for though the Germans, since the days of Heyne, Wolf, and Niebuhr, have indulged themselves in every variety of historical skepticism, and reduced H., as well as Cadmus and Hercules, to mere 'symbols,' the more sober genius of British criticism, with which the moderate views of the best later Germans coincide, has pronounced an almost unanimous verdict in favor of the historical reality of the author of the *Iliad* and the *Odyssey*. Not that any reliance is to be placed on the details of the old Greek lives of H., which are manifestly fictitious; but the internal evidence of the poems themselves leads to the belief in an authorship such as agrees substantially with the kernel from which these very ancient legendary traditions were developed. The central fact in which all these traditions agree is, that the author of these poems was an Asiatic Greek; and though other places are named, the greatest amount of legendary evidence clearly points to Smyrna as the city which had the honor of giving birth to the father of epic poetry. The dialect in which the *Iliad* and *Odyssey* are written—the Ionic—is the very variety of Greek afterward used in the same region by Herodotus, the father of History, and by Hippocrates, first and greatest of Greek physicians; and the allusions to natural phenomena, especially the frequent mention of the strong n.w. wind blowing from Thrace, plainly indicate the w. coast of Asia Minor as the familiar residence of the poet. The chronology of the Homeric poems, both as respects the great central event which they celebrate—the Trojan war—and the age of the poet himself, is much more doubtful; but it is quite certain that H. lived considerably before the recognition of a regularly received record of dates among the Greeks—that is, before the year B.C. 776, the commencement of the calculations by Olympiads. The date given by Herodotus for the age of H.—400 years before his own time, that is, about B.C. 850—is probable enough; but considering the entire lack of foundation for chronology in those early times, we must not seek an accuracy in this matter beyond that attained by the Greeks themselves; and we may allow a free margin of at least 200 years from the time of Solomon (B.C. 1000) downward, during which the singer of the *Iliad* and *Odyssey* may have lived. To throw him further back than the earliest of these dates would be inconsistent at once with the historical elements in the midst of which his poems move, and with the style of the language which he uses; for this exhibits a luxurious freedom, a rich polish, and an exquisite euphony, which removes it far from that roughness and clumsiness wont to characterize languages in their earliest stage of literary development. The Ionic dialect used by H. is, in fact, a highly cultivated shoot of the old Hellenic stock, and which was in the poet's hands so perfect for the highest poetical purposes as to have remained the model for the epic style during the whole period of the poetical literature of the Greeks.

In endeavoring to form a correct estimate of the position of H. as a poet, the primary fact from which we must start is, that he was not the epic poet of a literary age—like Virgil among the Romans, Tasso among the Italians, or Milton among Englishmen—but he was decidedly and characteristically an *aoidos*, or *minstrel*, a character well known from our mediæval literature, both in other shapes, and especially as presented by the kindred genius of Sir Walter Scott. That there is an essential and vital generic distinction between the popular minstrel of an age when books are either not known or little used, and the cultivated poet of an age which rejoices in all sorts of libraries, and possesses a special class of literary readers, admits no doubt. The conditions of the work to be done being different, the work itself cannot possibly be the same. It is quite certain, however, that the great majority of the English critics and translators of H. have not recognized this distinction. The consequence is, that they strike an entirely false note, and blow the seraphic trump of Milton when they should be content to take a plain shepherd's pipe in their hands. These critics and translators are no doubt actuated by the noble desire of redeeming the author of two such noble poems as the *Iliad* and the *Odyssey* from the vulgar fellowship of wandering minstrels and ballad-mongers; but however high the genius of H. unquestionably soared above the best of the mediæval ballads to which the English ear is accustomed, it is quite certain both that the materials out of which his great poems were composed were nothing but such popular ballads and tales as delighted our forefathers before the invention of printing, and that the spirit and tone of the Homeric epos is distinguished from that of the literary epos or epos of culture precisely by those characteristics which distinguish our old ballads from the poetry of Wordsworth and Tennyson. Of modern poets, the one who possessed the greatest relationship to the genuine old minstrel poets was Sir Walter Scott; but even in his poetry many peculiarities can be pointed out which mark the literary writer of a later age, as distinguished from the popular singer of a people's boyhood and lusty youth. In order to understand H., therefore, we must look on him as the culmination of the minstrel or ballad poetry, in the shape of the minstrel epos; a grand combination of popular ballad materials and ballad tone, elevated to the highest pitch of which it is capable, with the architectural form and structure of the epos. To the recognition of this true character of the Homeric poems, the present age has been led mainly by the adventurous and suggestive criticism of the celebrated scholar, Frederick Augustus Wolf. This distinguished German, originally a professor in Halle, afterward in Berlin, published in 1795 the *prolegomena* to a new recension of the text of H., in which he maintained the extreme skeptical view already alluded to, according to which the *Iliad* is no proper epic poem in the sense that the *Æneid* and *Paradise Lost* are so, but only a skilful compilation of popular ballads, originally separate, and of whose separate existence the sharp-eyed critic can now easily adduce satisfactory proof. Now, this theory commonly called, after its author, the Wolfian theory, and which has found, and still finds, not a few ingenious supporters in Germany, contains an important element of truth, which has too often been summarily rejected, with the error which it promulgates. It is not credible that poems pervaded by such a wonderful unity of tone and plan as the *Iliad*, manifestly inspired by a genius of the highest order, should be resolvable into the mere patchwork of skilful compilers; but it is an important truth to announce that the materials of H.'s poetry were not invented by himself, but taken up from the living traditions of the people to whom he belonged, and that even in the grand unity to which his genius has subjected them, their original popular tone and spirit is preserved in a fashion which characteristically distinguishes them from all epic poetry of the literary ages. This position, a golden mean between the extravagance of ultra-Wolfians and anti-Wolfians, was largely due to the scholarly work of Nitsch, Welcker, and K. O. Müller. Hermann carried Wolf's view further in some respects, and Lachmann boldly attempted to distinguish in the *Iliad* 16 independent 'lays.' Grote separated the *Iliad* into an *Achilleid*, and books not about Achilles; Geddes holds the *Achilleid* as earlier, as European Greek, while the other books are by the same author as the *Odyssey*, namely, by Homer. Many scholars, both ancient (the *Chorizontes*) and modern, affirm the *Iliad* to be by one author, the *Odyssey* by another.

The characteristics of H.'s poetry, as the culmination of ballad poetry and the grand model of the minstrel epos, may be expressed in few words. In the first place, the materials are essentially national, and if not strictly historical in every detail of decoration, grow, like all ballad poetry, out of the real life of the people, and rest at least on an honest historical substratum. In this view, the *Iliad* is as valuable for the earliest history of the Helenic race, as Herodotus and Thucydides are for the later periods. But it is not for the Greeks alone that H. possesses an important historical value; he is for all ages an important record of the earliest stages of human society, second only to the books of Moses, and perhaps some of the very oldest of the Vedas. The germs of almost all other arts and sciences afterward cultivated by the Greeks and Romans are found in Homer. In this view, he was to the Greeks themselves an encyclopedia of their national culture; and, as embodying the grand features of their polytheistic faith, he is also constantly quoted by their great ancient writers with all the deference due to a Bible.

The poems of H., as a great human inheritance, have naturally been incorporated, by translation, into all the languages of Europe. In Italian, the translations of Cesarotti and Monti—in French, that of Montbel—in German, that of Voss, are the most famous. In England, this great problem has been tried in the most various styles, and specimens of brilliant success in certain partial aspects have been produced. The whole excellence of H. has not yet been exhibited in any one of the notable English translations, nor is such a combination perhaps possible. The grand flow, rapid march, and sonorous fulness of the original, are well given by Pope; the rough dramatic vigor of individual phrases and passages are best rendered by Chapman; while the unaffected truthfulness, and easy, unpretending grace, which so prominently mark the great antique minstrel, appear most clearly in Cowper. Of recent attempts to present H. in some new aspect to English readers, it is premature to speak. We may mention the translations of Newman (1856), Worsley (1861–5), Dean Alford (1861), Simcox (1865), Lord Derby (1865), John Stuart Blackie (1866), Herschel (1866), Merivale (1869), W. C. Bryant (1870–71), and Butcher and Lang (*Odyssey*, 1879).

For the various questions connected with H. and the Homeric poems, consult the works on Greek literature by Colonel Mure and K. O. Müller; on Greek history by Grote, Curtius, and Cox; special works on H. by Mr. Gladstone, Prof. Geddes, and others; 'Homer' in Smith's *Dictionary*, and in the *Encyclopædia Britannica.*

HOMERIC, a. *hō-mĕr'ĭk:* pertaining to *Homer*, the great anc. poet of Greece, or to his age or poetry.

HOME RULE, in Ireland: title chosen to define the object of a political organization in Ireland, and of the party in the British Parliament representing that organization. The discouragement among the extreme Irish agitators which followed the suppression of the Fenian rising in 1867 opened the way for those who favored more constitutional methods of asserting the claims of the Irish people. The disestablishment of the church inclined many Protestant conservatives to co-operate with politicians of this stamp. At a meeting in the Bilton Hotel, Dublin, 1870, May 19, presided over by the lord mayor, a Prot. conservative, and attended by prominent Conservatives, Orangemen, Rom. Cath. Liberals, Nationalists, Repealers, and Fenians, a resolution was adopted 'that the true remedy for the evils in Ireland is the establishment of an Irish parliament with full control over our domestic affairs.' An organization entitled 'The Home Government Association of Ireland,' was formed, the object of which was stated in the rules to be, to obtain for the country the right of managing its own affairs by a parliament assembled in Ireland, which should legislate for and regulate all matters relating to the internal affairs of Ireland, and have control over Irish resources and revenues, subject to the obligation of contributing a just proportion of the imperial expenditure. Such matters as the adjustment of relations with foreign states, colonies, and dependencies, and the defense of the empire, were to be left to the imperial legislature; and the new adjustment of the relations between the two countries was to be attained 'without any interference with the prerogatives of the crown, or any disturbance of the principles of the constitution.' This programme, according to those who put it forth, was at once less and more than the Repeal which O'Connell had demanded. It implied a surrender of any Irish claim to control imperial supplies, but demanded a responsible Irish administration. Mr. Butt, Q.C., who had become popular through his exertions in defense of the Fenian conspirators, and who had since been pres. of the Amnesty Assoc., took the lead of the new movement, which showed its strength 1871 by carrying its candidates at by-elections for Meath, Galway, and Westmeath counties, and for Limerick borough, where Mr. Butt was returned unopposed. In 1872 the Assoc. continued to gain influence, and adopted 'Home Rule' as its watchward. In 1873, Nov., a national conference was held in Dublin: it was attended by 900 delegates from all parts of Ireland. The Home Government Assoc. was dissolved, and a new organization, entitled the Home Rule League, which took its place, adopted the programme of the older body without important alteration. At the general election 1874, Feb., the Home Rulers carried 60 seats. In the following month the movement first asserted itself in parliament. Mr. Butt moved an amendment to the address, expressing dissatisfaction with the existing system of government in Ireland. In his speech he defined Home Rule as leaving the management of all exclusively Irish affairs to an Irish parliament, and he asked that constitutional self-government should be conceded to his country. The amendment was rejected by 314 to 50. In the three following sessions a motion for a committee to inquire into the causes of Irish discontent was brought forward, but on each occasion defeated by a large majority. Symptoms of disagreement soon appeared in the Home Rule party itself. Mr. Butt favored a policy of incessantly proposing reforms in the details of Irish legislation, while also urging on parliament the general objects of the party. The more extreme section, of which Major Nolan and Charles Stuart Parnell soon came to be recognized as leaders, regarded this as too moderate a plan of campaign, and applied themselves to the task of rendering the imperial parliament unable to discharge its functions by the dexterous use of the method of obstruction. A strong section of the party approved of Mr. Parnell's tactics and by the beginning of 1878 the control of parliamentary action and of the movement generally had passed out of the hands of Mr. Butt, whose death, 1879, marked the close of the original and more moderate phase of the Home Rule agitation. Afterward, the Home Rulers were, for a time, obscured by the more violent agitation of the Land League, and the outrages and anarchy that accompanied that agitation. The Land League was mainly promoted by many of the more energetic Home Rulers.

During these years Mr. Gladstone did not give the movement any material encouragement either as member of parliament or as prime minister; and the liberals kept as distant as the tories from the Home Rulers, or Parnellites as they were unofficially called. But the sudden adhesion 1885 of the 'great commoner' to the principles for which the Home Rulers had vainly contended, gave the movements a greater zest than it previously had. The triumph of the liberals 1885, Nov., led to Gladstone's return to power. Immediately after he became prime minister, he caused it to be widely announced that he was prepared to introduce a H. R. measure. This caused a great defection in his own party, encouraged the growing H. R. minority in parliament and aroused keen interest in political circles generally. The promised bill was introduced 1886, Apr. 8, and supported in a long and powerful speech—one of the greatest of all Gladstone's efforts. On the following night a combination of liberals and tories defeated a second reading of the bill by a majority of 30. Gladstone's almost immediate appeal to the country resulted in a strong opposition majority in parliament and his retirement from office. The management of the agitation then devolved on Parnell with William O'Brien as his most effective ally. Parliament continued to pass coercive and defeat ameliorating bills for the people of Ireland. Land League meetings were constantly 'proclaimed;' H. R. members of parliament were arrested and imprisoned on pretexts that appeared frivolous to dispassionate observers; restrictive measures were enforced with great military show; and the Home Rulers steadily gained strength in parliament through the by-elections. Suddenly, 1887, Mar. 7, the London *Times* created a deep and far-reaching sensation by publishing the first of a series of three articles entitled *Parnellism and Crime*, in which it attempted to fasten upon Parnell and his associates the guilt of sympathy with the Phœnix Park (Dublin) murders. The third article appeared Mar. 14, and on the 18th—when the Crimes Amendment, or Coercion Bill as it was commonly called, passed its second reading—the *Times* published the fac-simile of a letter which it asserted was written by Parnell, dated '15, 5, 82' claiming that the prompt denunciation of the Phœnix Park murders by himself and his associates was 'our best policy,' and stating 'though I regret the accident of Lord F. Cavendish's death, I cannot refuse to admit that Burke got no more than his deserts.' The *Times* asserted that its various charges were based on letters in Parnell's own hand-writing. Parliament appointed a special commission to investigate the *Times's* charges. This held a preliminary session 1888, Sep. 17, and began taking evidence Oct. 22. The chief witness for the *Times* was Richard Pigott, who after testifying (1889, Feb.) with great detail, privately confessed that he had forged the letters in the possession of the *Times*, fled to Madrid, and killed himself Mar. 1. Notwithstanding this virtual defeat of the *Times's* case, the commission continued to sit at irregular intervals; and announced, 1889, May, that it would not conclude its labors before 1890, Jan. The programme of the Home Rulers as advanced by Parnell 1888, July, is to secure separate local parliaments for England, Ireland, Scotland, and Wales, and a general parliament for the empire. See GLADSTONE, WILLIAM EWART.

HOME'STEAD EN'TRY: method of acquiring legal possession of land for the purpose of creating a home; generally used to designate the regulations of the U. S. General Land Office for the disposal of public lands. The federal govt. owns and controls vast tracts of land, acquired by purchase and the extinction of Indian titles. These are included in Indian and public reservations, great mountain areas, and areas wholly unproductive and unavailable for ordinary purposes. In 1888, June 30, the total number of surveyed acres of public lands in the states and territories was 976,626,672, unsurveyed 838,877,475, total in acres 1,815,504,147; 2,836,725 sq. m. The total govt. land grants to that date were, to states for public wagon roads 1,782,731 acres, to states for canals 4,424,073, to states and corporations for railroads 49,907,136; total 56,113,940. In the fiscal year then closed there were 6,676,616 acres entered under the homestead acts of congress, and 3,795,305 under the timber culture acts. Between 1885, Mar. 4 and 1888, May 12, the total acreage restored to the public domain and opened to entry was 80,690,721 acres; and the total recommended for recovery for various reasons 65,020,538 acres. Since the close of the civil war there have been many changes in the laws relating to the pre-emption of public lands; but it may be generally stated that these lands are open to settlement by citizens of the United States excepting (1) lands reserved by any treaty, law, or presidential proclamation, for any purpose, (2) lands lying within the limits of any incorporated city or town, (3) lands actually settled or used for business purposes and not for farming, and (4) lands on which salt-springs or mines are located. Every head of a family, widow, or single person, over 21 years old, and a citizen of the United States or in the actual process of becoming a citizen, who may settle upon any quarter-section (160 acres) of public lands, has the right under the pre-emption law of prior claim to purchase on complying with the prescribed regulations. The public lands are divided into two classes: one for which the govt. charges $1.25 per acre, the other the reserved alternate sections in railroad grants for which $2.50 per acre is charged. No person is entitled to more than one pre-emption. Under the homestead laws the settler must occupy and cultivate his pre-empted quarter-section for 5 consecutive years to complete the purchase and receive title. An abandonment of the land leads to forfeiture. The timber culture law provides in brief that any settler who has cultivated for two years at least 5 acres in trees of an 80-acre homestead, or 10 acres of a 160-acre tract, is entitled to a free patent for the land at the end of 8 years. The management of the U. S. General Land Office is vested in a commission, the bureau being subordinate to the dept. of the interior; and for the accommodation of proposed settlers the govt. has established 109 land offices, on or near the available tracts, where the entry steps and all business excepting the issue of title are transacted.

HOMESTEAD LAWS: statutes enacted by state legislatures, or provisions in state constitutions, exempting homesteads from attachment or levy and sale on execution, to a specified extent. Ala., Ark., Cal., Fla., Ga., Ind., Kan., Mich., Minn., Nev., N. C., S. C., Tex., Va., and Wis. have adopted H. L.; and Conn., Del., Or., R. I., and W. Va. are without them (1889). Legislation has been had in other states, but more in the line of providing privileges under various legal procedures than in that of direct exemption. The H. L. differ in details in each state, but the values of exemptions are substantially as follows: *Ala.* home worth $2,000 and $1,000 personal property; *Ark.*, home $2,500, personal property $500; *Cal.* home $5,000, personal property scheduled; *Colo.* home $2,000, personal property scheduled; *Conn.* no home exempted, personal property scheduled; *Dak.* home 160 acres, $1,500 personal property; *Del.* no home exempted, $200 personal property; *Fla* farm (country), house and lot (city), $1,000 personal property; *Ga.* home, personal property or both $1,600; *Ida.* home $5,000, personal property scheduled; *Ill.* home $1,000, personal property scheduled; *Ind.* home and personal property $600; *Io.* 40-acre farm or city house and lot, personal property scheduled; *Kan.* homestead of 160 acres or house and 1 acre in city or village, personal property scheduled; *Ky.* home $1,000, personal property scheduled; *La.* home actual, personal property $2,000; *Me.* home $500, personal property scheduled; *Md.* no home exempted, personal property $500; *Mass.* home $800, personal property scheduled; *Miss.* home $2,000, personal property scheduled; *Mo.* home $1,500 (country), $3,000 (city), $300 personal property (head of family); *Mich.* home $1,500, personal property scheduled; *Minn.* home 80-acre farm, house and lot in town or city, personal property scheduled; *Mont.* home $2,500, personal property from $1,400 (scheduled); *Neb.* home $2,000, personal property $500; *Nev.* home $5,000, property $1,500; *N. H.* home $500, personal property scheduled; *N. J.* home $1,000, personal property $200; *N. Y.* home $1,000, personal property scheduled; *N. M.* home $1,000, personal property scheduled; *N. C.* home $1,000, personal property $500; *O.* home $1,000, personal property $500; *Or.* only scheduled personal property exempted; *Penn.* home or personal property $300; *R. I.* only scheduled personal property exempted; *S. C.* home $1,000, personal property $500; *Tenn.* home $1,000, personal property $500; *Tex.* home $5,000, personal property scheduled; *Utah*, home $1,000, personal property, head of family, from $700, each member of family $250; *Vt.* home $500, personal property scheduled; *Va.* home or personal property or both $2,000; *W. Va.* home $1,000, personal property $200; *Wash. Ter.* home $1,000, personal property scheduled; *Wis.* 40-acre farm or house and lot in city or village, personal property scheduled; and *Wyo.* home $1,500, personal property scheduled. The schedules of personal property embrace furniture, farm stock and implements, wearing apparel, tools, etc. In each state the amount of every kind of personal property exempted is specifically stated in statutes or otherwise.

HOMICIDE, n. *hŏm'ĭ-sīd* [F. *homicide*—from L. *homĭcīdĭŭm*, homicide—from *homo*, a man; *cado*, I strike or kill]: in *law*, the killing of one human creature by another; also the person who kills—manslayer. In law the term denotes the mere killing of a human being without implying the attendant criminal responsibility. It is used with the word *justifiable*, to denote that the killing was done under lawful authority, as hanging a man, or killing a prisoner as a last resort to prevent him escaping, or killing one as a last resort to prevent his commission of an atrocious crime. *Excusable homicide* means killing in self-defense, or in defense of a wife, child, parent, or servant, or property, or by mere accident. The line between the justifiable and the excusable is not clearly drawn. *Felonious homicide* includes murder (q.v.) of one's self or of another; and *manslaughter* (q.v.) is killing without malice, but attended with negligence, hot blood, or in some unlawful way. In Scotland, excusable homicide is generally called culpable homicide. HOM'ICI'DAL, a. *-sī'dăl*, inclined to kill, murderous, bloody. HOMICIDAL MANIA, blind irresistible tendency to destroy human life; the *monomanie meurtrière* of the French. It is developed, under certain morbid conditions, is independent of hatred or any appreciable incentive, and even acts in opposition to the general disposition, the interests and the affections of the perpetrator. Dr. Otto of Copenhagen has recorded a series of motiveless murders. Georget gives the case of M. N., who was silent and solitary, but reasonable, and confessed a desire to shed blood, and particularly that of his mother and sister by poniard. He deplored the dreadful tendency, for he loved them both tenderly. Yet the fit returned, and he cried out: 'Mother, save thyself, or I will cut your throat!' The victim selected is most frequently a child, a wife, a benefactor, or an object of love and respect. Hoffbaüer, in Germany; Esquirol, Marc, Foville, in France; and Conolly, in Britain, all have demonstrated, and in criminal courts have testified to the existence of this form of mental disease, and ground of irresponsibility; but no recognition has been obtained of the irresistible, motiveless homicidal tendency as a bar to trial or to punishment. The impulse, however, is manifested in a more complicated form. It may originate in delusions; and the act which first reveals the mental condition may be committed in supposed self-defense, or to secure the salvation, or prevent the suffering of the individual destroyed. Such manifestation may constitute the characteristic symptom of furious madness, where the excited maniac sacrifices all around, or all who resist his course, under the instigation of the predominating passion, or of melancholia and despondency. There occur periods when the tendency to shed blood becomes epidemic or imitative. There is in many natures an ill-defined satisfaction on hearing of slaughter, wars, and atrocities; and such details, or the sight of blood, are said to be suggestive of this tendency. Marc states that six cases of infanticide followed immediately upon the publication of the trial and history of Henriette Cornier, who cut off the head of her child. The puerperal condition, various hereditary tendencies, powerful moral impressions, and atmospherical influences, are conceived to induce this tendency. The proximate cause is generally found to consist in marked organic changes in the nervous system, such as are detectable in epilepsy; or in the more insidious and obscure structural alterations, which are supposed to accompany perverted and depraved instincts; though homicidal mania may occur independently of either of these pathological conditions.

Esquirol, *Des Maladies Mentales;* Marc, *De la Folie;* works by other French specialists: Tardieu, De Boismont, Despine; the Medical Journals; and Bucknill and Tuke, *Psychological Medicine.*

HOM'ILDON, Battle of: in the border warfare between England and Scotland, 1402. A Scottish army of about 10,000 men invaded England, under Sir Murdach Stewart of Kincleven, eldest son of the Regent Albany, and of Archibald, Earl of Douglas. They advanced to the gates of Newcastle without opposition, and were returning to Scotland laden with spoil, when they were encountered by an English force under the Earl of Northumberland, his son Hotspur, and the exiled Earl of March or Dunbar. The Scotch took up their position on Homildon Hill, near Wooler. Sep. 14, Hotspur was advancing to charge them, when he was stopped by the Earl of March, until the English archers should do their work. The work of the archers was deadly; and though the Scots, rallied by Sir John Swinton, charged bravely on their foes, the English had an easy victory, and the Scots were utterly routed. Their leaders were taken prisoners; five of their best knights, with many of their bravest esquires, were slain; and besides the numbers that were killed on the field by the English arrows, about 500 were drowned in attempting to cross the Tweed.

HOMILETICS, n. plu. *hŏm'ĭ-let'ĭks* [Gr. *homīlētĭkŏs*, social,—from *homīlĕō*, I converse, I have intercourse with]: that branch of theology which treats of sermons, or of the more familiar homily, and the best way of preparing and delivering them. The earliest writer on the subject of homiletics is St. Augustine, whose book, *De Doctrina Christiana*, is in some sense an adaptation of profane rhetoric to sacred uses. Rabanus Maurus and Isidore of Seville also incidentally treat the subject; but the nearest approach to a systematic treatment of the subject in mediæval literature is in Hunibert, *De Eruditione Concionatorum*. St. Carlo Borromeo's *Instructiones Pastorum* was a part of his general scheme for the improvement of clerical education; and in the ecclesiastical course, as well of Rom. Catholics as of Protestants, homiletics have an important place. The bare enumeration of the works of Schott, Marheineke, Theremin, Sailer, Gisbert, Brand, Laberenz, may show the importance attached in both churches to this branch of sacred science. Hom'ilet'ic, a. *-ĭk*, or Hom'ilet'ical, a. *-ĭ-kăl*, pertaining to. Hom'ily, n. *-lĭ* [mid. L. *homilĭă*, a homily]: plain familiar sermon (see below). Hom'ilist, n. *-lĭst*, a preacher.

HOMILIA'RIUM: collection of homilies for the use of pastors; in use from a very early period. Mabillon mentions a very ancient Gallican homiliarium (*De Lit. Gallican.*). The 50 homilies of Venerable Bede, too, were in familiar use among the clergy in all parts of the West, and we find in the letters of the early mediæval time, traces of a busy interchange of sermons, original or otherwise, between bishops and clergy, even in distant countries. The supply, however, was imperfect and scanty, and one of the many reformatory measures of Charlemagne was a compilation of homilies under the title of homiliarium, made in the end of the 8th c. under his direction by the deacon Paul Warnefried, and containing homilies for all the Sundays and festivals of the year. Many synods of that and subsequent periods directed the clergy to translate these sermons for their flocks, and the collection continued in use for this purpose till the 16th c. It was printed at Speyer 1482, again at Cologne 1557. A collection of homilies is ascribed also to Alcuin, but it seems more likely to have been but a modification of the homiliarium of Warnefried. A collection of

English homilies turned into verse, that they might be more readily remembered by the people, appears to have been composed about the middle of the 13th c.: this collection, affording a metrical sermon for every Sunday and festival day in the year, exists in MS.; and a portion of it has recently been edited by Mr. Small, librarian to the Univ. of Edinburgh.

HOMILY: primitively signifies discourse held with one or more individuals, but in ecclesiastical use it means a discourse held in the church, and addressed by the minister to the congregation. The practice of explaining in popular form the lessons of Scripture read in the synagogues, had prevailed among the Jews, and appears to have been adopted in the Christian churches from earliest times. The discourses employed for this purpose were of the most simple character; but with the exception of one ascribed to Hippolytus (q.v.), we have no sample of this form of composition earlier than the homilies of Origen, 3d c. Taking these as a type, the early Christian homily may be described as a popular exposition of a portion of Scripture, accompanied by moral reflections and exhortations. It differs from the sermon [Gr. *logos*, Lat. *oratio*] in eschewing all oratorical display, and in following the order of the scriptural text or narrative, instead of being thrown into the form of a rhetorical discourse or a didactic essay. The schools of Alexandria and Antioch appear to have been the great centres of this class of sacred literature, and in the early centuries we find the names of Hippolytus, Metrodorus, Clement of Alexandria, Dionysius, and Gregory Thaumaturgus, as principally distinguished. But it was in the following centuries that the homily received its full development in the hands of the Oriental Fathers, Athanasius, the two Gregories, of Nyssa and of Nazianzum, Basil, the two Cyrils, of Jerusalem and of Alexandria, and above all, Chrysostom; and in the West, of Ambrose, Augustine, Peter Chrysologus, Leo, and Gregory the Great. In later centuries, Venerable Bede, the popes Sabinian, Leo II. and III., Adrian I., and the Spanish bishops, Isidore of Seville and Ildefonsus, continued to use the homiletic form; and even in the modern church, many preachers have regarded it as the best medium of scriptural instruction; and two different forms of homily are distinguished, the higher and the lower. The former follows the order of matter, rather than of any scriptural passages assumed to be expounded; the latter is a purely exegetical and moral exposition of some lesson from the liturgy, or of some other extract from Holy Scripture.—This strictly historical acceptation of the name homily is not uniformly observed in modern use. The name homily is very frequently used, almost as a synonym for sermon, and signifies nothing more than a plain, moral discourse, without ornament or rhetorical pretension, but equally without any pretension of being molded on the ancient patristical model.

HOMILIES OF THE CHURCH OF ENGLAND: collection of sermons, the first part of which was published 1547, the first year of the reign of Edward VI., to be read in the churches, partly to supply the defect of sermons, but partly, also, to secure uniformity of doctrine, and to guard against the heterodoxies, old and new, which at that time threatened the unconsolidated church. The second part was published 1562, in the reign of Elizabeth, at the same time with the articles. The 35th article declares that 'the Book of Homilies doth contain a godly and wholesome doctrine, and necessary for these times:' the 21 titles are enumerated in the article. The homilies are not now read in churches; but there is no law to prevent their being so read, and they are frequently appealed to in controversies as to the doctrine of the Anglican Church on the points of which they treat. Their precise degree of authority is matter of doubt.

HOM'INE REPLEGIAN'DO: old writ in English law, meaning to bail a man out of prison; now disused.

HOMING, n. *hōm'ĭng* [see HOME]: a name applied to the faculty possessed by carrier-pigeons of finding their way *home* after being carried away to a distance of many miles.

HOMINIDÆ, *hō-mĭn'ĭ-dē* [Lat. *homo,* man—meaning man-family]: term proposed by some naturalists to designate man as a family in the same order with the QUADRUMANA—thus placing man with apes and monkeys in a new order, PRIMATES. This proposal has not found general favor among naturalists. Some of them instead classify man by himself in the order BIMANA, maintaining with Prof. Owen, that 'man is the sole species of his genus, the sole representative of his order.' Under the order BIMANA, men are grouped in varieties and races, but not into genera. Others reject altogether such classification of man with brutes. See BIMANA: MAN.

HOMINY, n. *hŏm'ĭn-ĭ* [Indian word *auhūmĭnĕă*, parched corn]: Indian-corn meal, a bread-stuff of N. America.; a dough-cake made from it.

HOMO, *hō'mō,* sometimes *hŏm'ō* [Gr. *homos,* similar or same]: a common prefix, meaning 'same, similar, or alike.'

HOMOCARPOUS, a. *hō'mō-kâr'pŭs* [Gr. *homos,* alike; *karpos,* fruit]: having all the fruits of a flower-head alike.

HOMOCENTRIC, a. *hō'mō-sĕn'trĭk* [Gr. *homos,* similar; *kentron,* the centre]: having the same centre; concentric.

HOMOCERCAL, a. *hō'mō-sér'kăl* [Gr. *homos,* alike; *kerkos,* the tail]: having equally-bilobate tails, as the herring, the cod, etc.: see HETEROCERCAL.

HOMOCHROMOUS, a. *hō'mō-krō'mŭs* [Gr. *homos,* alike; *chrōmă,* color]: applied to flowers when all the florets in the same flower-head are of the same color.

HOMODROMOUS, a. *hō-mŏd'rŏ-mŭs* [Gr. *homos,* alike; *dromos,* a course]: in *bot.*, running in the same direction, as spirals, or leaves on the stem and branches.

HOMŒOMERIC, a. *hō'mē-ō-mĕr'ĭk* [Gr *homoios,* similar; *meros,* a part]: having sameness of parts.

HOMŒOPATHY, n. *hō'mē-ŏp'ă-thĭ* [Gr. *homoios*, similar, like; *pathos*, suffering]: a mode of treating diseases by the administration of medicines which are found capable of exciting in healthy persons symptoms closely similar to those of the disease of the patient under treatment. Ho'mœopath'ic, a. *-ō-păth'ĭk*, or Ho'mœopath'ical, a. *-ĭ-kăl*, pertaining to homœopathy. Ho'hœopath'ically, ad. *-lĭ*. Ho'mœop'athist. n. *-ŏp'ă-thĭst*, one who believes in and practices homœopathy. *Note.*—The *o* in *œ* is very often dropped in the spelling.

HOMŒOPATHY, *hō'mē-ŏp'a-thĭ:* a system of medicine introduced into practice about the close of last century, by a German physician named Hahnemann (q.v.). It is founded on the belief, that medicines have the power of curing morbid conditions similar to those conditions which they have the power to excite; expressed in Latin by the phrase, *Similia similibus curantur,* and in English by 'like cures like.' That diseases are cured by substances which produce in persons in health symptoms like those presented by a patient, has been from the earliest times a recognized fact, both by medical writers and by poets who have expressed the prevailing belief of the ages in which they lived. Among the former, we find the author of a treatise generally ascribed to Hippocrates, entitled *On the Places in Man.* This writer gives numerous examples of what may be called *homœopathic* cures; and recommends for the cure of mania this remarkable prescription: 'Give the patient a draught made from the root of mandrake, *in a smaller dose than sufficient to induce mania.'* The works of the poets abound with illustrations of this belief. Probably the oldest expression of it is in some lines ascribed by Athenæus to Antiphanes (B.C. 404), thus translated—

'Take the hair, it is well written,
Of the dog by which you're bitten;
Work off one wine by his brother,
And one labor with another;

Shakespeare, in *Romeo and Juliet,* expresses the same maxim:

'Tut, man! one fire burns out another's burning;
One pain is lessened by another's anguish.

* * * *

Take thou some new infection to the eye,
And the rank poison of the old will die.'

Milton, in the preface to *Samson Agonistes*, gives his version thus: 'In physic, things of melancholic hue and quality are used against melancholy, sour against sour, salt to remove salt humors,' etc. Thus, there has always been a vague tradition that medicines sometimes cured diseases similar to those they caused. But it was reserved for Hahnemann to propound the startling dogma, not only that medicines did occasionally produce such cures, but that true, direct, and radical cures could be effected only by recognizing this principle as the guide for the selection of the right remedy in any given morbid condition of the system. He engaged his friends and disciples in the task of procuring accurate data on which to proceed in reducing his rule to practice. They took given quantities of the substance which was the subject of experiment, and each kept a record of the effects that it produced. The various records thus obtained were submitted to Hahnemann, who compared them together and with his own observations on himself, and out of the results thus obtained, compiled what is named 'a proving' of the medicine. Hahnemann lays it down as one of the fundamental propositions of homœopathy, that no medicine should be given to the sick which has not first been *proved* upon those in health. He devoted himself to this task, and has left ten volumes of such 'provings;' out of this work the various abridgments in popular use in this and other countries have been derived. The properties once determined, then it becomes possible to administer it in accordance with the principle of homœopathy. To do so, however, it is requisite that the medicine should be given by itself. Thus, the second proposition of Hahneman's system is, 'that only one medicine should ever be given at once.'

To ascertain the effects of medicinal substances on persons in health—from the knowledge thus obtained to select a remedy whose action corresponds with the symptoms of the patient under treatment—to give this remedy by itself alone, are three of the fundamental rules for the practice of homœopathy. The fourth is, that the dose of a homœopathic medicine should be so small as not to cause any general disturbance of the system, its action being limited to that portion of the body which is in a morbid condition. How small that is, can be ascertained only by experiment. Hahnemann pointed out that the amount of the effect of a medicinal substance depends upon two conditions: *first*, the mechanical form inwhich it is administered; and *second*, the state of the body of the person who takes it.

For example, a hard pill of belladonna of five grains, swallowed by a robust and healthy man, may be followed by only trifling symptoms; but let that pill be dissolved in a pound of water, and an ounce of the solution be given every hour, then will ensue well-marked symptoms of the poisonous action of the drug. But if, instead of administering it to a person in health, it be given to one who is suffering from such an inflammation of the tonsils as belladonna produces, then it will be found that the inflamed tonsils will be most acted upon by their specific irritant. Disease implies a preternatural sensitiveness. An inflamed eye cannot bear light, an inflamed stomach cannot bear food, and every diseased organ is powerfully affected by the particular substance which has, in its physiological operation, a close affinity with the character of the morbid condition in which it is at the time when its specific medicine is administered.

To arrive at the degree to which it was desirable to reduce the dose, a series of experiments were necessary. It was a matter to which all *a-priori* reasoning was inapplicable. In an article published in *Hufeland's Journal*, 1801, Hahnemann observes: 'You ask me what effect $\frac{1}{100000}$ of a grain of belladonna can have. The word *can* is apt to lead to misconceptions. Let us ask Nature what effect $\frac{1}{100000}$ of a grain of belladonna *has*.' He then states the conditions of the experiment—viz., that this fraction of a grain should be administered to a patient suffering from a peculiar form of scarlet fever then prevalent in Germany, and presenting a combination of symptoms bearing a close resemblance to those produced by belladonna. Hahnemann maintained that this fraction of a grain was sufficient for the purposes of homœopathic cure.

Homœopathic doses are often expressed by fractions, thus: Suppose the medicine to be a vegetable substance; a strong tincture is made of it, technically called the *mother tincture.* Two scales of dilution are prepared from this, called respectively the *decimal* and the *centesimal:* the latter was advocated by Hahnemann: the former, though of recent introduction, is now largely employed. To prepare the *decimal* attenuations, 1 drop of mother tincture is added to 9 drops of alcohol, and it is labelled $1^{\times}$. The *second decimal dilution* ($2^{\times}$) is formed by adding 9 drops of spirit to 1 drop of $1^{\times}$, and so on for the $3^{\times}$, etc. In preparing the *centesimals*, one drop of mother tincture is added to 99 drops of alcohol, so as to dilute it 99 times, and this preparation is called *the first dilution*, and marked 1. Again, a drop of number 1—that is, of the $\frac{1}{100}$ of a drop of the mother tincture—is mixed with other 99 drops of alcohol, and marked 2, or the second dilution. This contains $\frac{1}{100}$ of a drop of $\frac{1}{100}$ of a drop of the mother tincture, or $\frac{1}{10000}$ of a drop of the mother tincture. This simple process of subdivision is continued, and each step is recorded in the same way: thus, number 3 means a millionth; number 6, a billionth; and number 30 (the highest recommended by Hahnemann), a decillionth. Insoluble substances, of course, cannot be thus treated; they are triturated with sugar of milk. One grain, say, of sulphur is triturated with 99 grains of sugar of milk, forming *the first trituration*, and marked number 1, and so on; but after advancing to the fifth or sixth, then it is presumed that all substances become soluble in this very minute proportion in alcohol, and alcoholic dilutions are made of them in the same way as of the vegetable tinctures. After making these alcoholic preparations, the homœopathic chemist saturates with them minute pellicles of sugar of milk, known technically by the name *globules* or *pilules.* It must, however, be borne in mind that small doses are not necessarily homœopathy, which consists in the administration of drugs according to the law of *similars*, the *dose* being a matter in which experience has guided to dilutions in many, though not in all cases.

It is claimed that in the homœopathic system of practice, the selection of the medicine is made according to a simple rule based on a law of nature, while in all other systems there is necessarily more or less empiricism and uncertainty. This natural law is, that the introduction of any poisonous drug into the animal organism gives rise to two series of effects which are opposite in character. Thus, *Aconitum* produces chilliness, tingling, numbness, weakness, and fever, but followed by heat, flushings, and general physical and mental excitement. *Belladonna* causes congestion of the face and brain, delirium, dilated pupils, dry throat, full, bounding pulse, rise of bodily temperature; but followed by contraction of the capillaries, contracted pupils, moist throat, small pulse, and lowering temperature. *Nux vomica* causes stimulation of the motor nerves, shown by increased reflex irritability and spasmodic movements; but followed by diminished irritability and paresis. *Opium* causes insensibility, immobility, slow respiration, contracted pupils, and constipation; but followed by irritability, insomnia, quickened respiration, slightly dilated pupils, and relaxation of the bowels.

This alternation of conditions under the action of poisons is a law of the vital economy which does not depend on any peculiarities of the individual drugs. The primary or yielding symptoms are of short duration, and are more marked when the dose is large: the secondary or reactionary symptoms are of longer duration, and are more marked when the dose is small and often repeated. In the homœopathic treatment of disease, it is desired to bring into prominence the teasing action of the drug which excites the resisting powers of the living organism. For this reason the best results are obtained when the dose is just large enough to arouse the antagonism of nature, without developing in any marked degree the so-called primary or poisonous action of the drug.

Theoretically, there are four possible rules for the selection of drugs for the cure of the sick. The poisonous effects of the selected drug must be related to the symptoms of the patient in one of the following ways: 1st, exactly opposite—antipathic; 2d, approaching opposite—allopathic; 3d, the same—isopathic; 4th, similar—homœopathic. Strictly antipathic practice is practically out of the question, because of the limitations of the materia medica. Strictly isopathic practice is likewise impracticable except in cases of poisoning, and its efficiency is questionable.

The 'allopathic' method is the practical application of the antipathic theory. It consists in the choice of a drug which will produce in the healthy symptoms different from those of the patient; the aim being to oppose the disease symptoms by the primary or overpowering action of the drug. Although this is the more obvious practice and though in some acute disorders it is satisfactory and safe, it is open to serious objections. 1st, So much depends on the intelligence, skill, and judgment of the physician as to what symptoms or conditions are the true opposites of those presented by the patient. Thus it is very difficult to prescribe antipathically for neuralgia, rheumatism, catarrh, croup, and other common ailments. Again, the cures by drugs given in large doses are often only temporary. Constipation may be treated by cathartic drugs, but it is a well recognized fact that the artificial diarrhea is followed by constipation, and the patient is generally worse in the end, because the secondary action of the medicine tends to confirm the previous habit. On the other hand there is comparatively little risk of an error of judgment in the selection of a remedy homœopathic to neuralgia, rheumatism, catarrh, croup, or constipation. Besides, owing to the necessary reduction of the dose, the curative action of the drug will not be followed by a reaction in the opposite direction.

The 'provings' of drugs, instituted by Hahnemann, have been continued to the present day with the addition of certain safeguards against error, prominent among which are the requirement that the trustworthiness of the prover should be tested before or during the experiment by the introduction of 'blanks' or inert substances; that the prover should, if possible, be ignorant of the effects expected from the drug; that the thermometer and other instruments of precision, as well as the modern improved means of diagnosis, be made use of when applicable. A considerable portion of the materia medica is derived from accidental poisonings, and from the incidental effects of large doses given in the treatment of chronic diseases, but these latter sources are to be received with great circumspection, since they lack some of the elements of certainty which belong to pure experiment. The practice of homœopathy must be based on a 'pure' materia medica, i.e., a materia medica which includes nothing but the effects of drugs on healthy persons. These effects must be minutely described and placed in proper chronological order, mention being made of the conditions of aggravation or amelioration of the drug effects. 'Cured' symptoms or disease-conditions can form no part of the homœopathic materia medica. They are excluded because of their general untrustworthiness, and because, when truthful, they may represent the reactionary effects of the drug, which could not form the basis for homœopathic selection. Some of the more important text-books on pure materia medica are Hahnemann's *Materia Medica Pura,* Hahnemann's *Chronic Diseases,* Allen's *Cyclopædia of Materia Medica,* Hughes' and Dake's *Cyclopædia of Drug Pathogensy,* Hempel and Arndt's *Materia Medica,* Hale's *New Remedies.* There are also many condensed compilations for reference by the practitioner.

A system so revolutionary naturally encountered determined opposition. In Germany, there were legal obstacles to its practice. In Austria, physicians were not allowed to dispense their own medicines, even gratuitously; all medicines administered to the sick were prepared by the apothecaries, and the fate of homœopathy could not be trusted to their hands, as their interests were deeply involved. Thus it happened that, from 1818 to 1836, homœopathy was only tolerated in Austria under exceptional circumstances. In 1836, cholera broke out for the second time in Vienna, and Dr. Fleischmann, physician to an institution in which homœopathy has been followed, was required by government to prepare the hospital for the reception of cholera patients. He undertook the charge, on the condition that he was to be allowed to employ homœopathy in their treatment. This was granted, homœopathy having been very successful in Vienna and different towns in Germany in cholera 1830–31. He treated 732 cases; of these, 488 recovered, and 244 died. The hospital was under daily inspection by the government, and the result of the treatment was made known to Count Kolourat, the home minister. Shortly afterward the emperor issued an ordinance granting to every duly qualified physician the right to practice homœopathy. The cholera mortality under homœopathic treatment was in this instance one in three, while the average mortality of the same epidemic at the same place was two in three.

When cholera was approaching w. Europe, Hahnemann was studying his 'provings,' to ascertain what substance resembled most nearly in its effect the symptoms of the disease. The medicine he found to be camphor; and before he had ever seen a case of cholera, guided by the details given by practitioners, he announced in 1831: 'Every one, the instant any of his friends is taken ill of cholera, must immediately give him camphor.' This bold prediction, that camphor was the antidote for the first stage of cholera, was soon tested in Hungary and Moravia, and camphor has since been accepted universally by homœopathists as the most efficient remedy against an invasion of cholera.

The reported success of the homœopathic treatment of cholera at Vienna had a powerful influence in directing public attention to the hospital where the new system was practiced. Physicians from all parts of Europe and from America went thither to watch the treatment. In a report published by Dr. Fleischmann several years ago, it is stated that at that time he had treated 17,313 cases, chiefly of acute diseases. Among these were—of erysipelas, 514 cases, of which 510 recovered; of rheumatic fever, 1,417, of which 1,416 recovered; of intermittent fever, 1,066, of which 1,058 recovered; of inflammation of the lungs, 1,052, of which 1,004 recovered.

From Germany as a centre, where it is now extensively practiced and taught, homœopathy spread over Europe and America. It was introduced into England in 1827 by Dr. Quin, physician to the king of the Belgians; and there are now more than 300 registered practitioners in Britain who have adopted it. In London there is a hospital capable of containing more than 100 patients, where lectures are occasionally delivered by appointed teachers.

The American Institute of Homœopathy, organized 1844, is a large and energetic scientific body, devoted 'to the improvement of homœopathic therapeutics and all other departments of medical science.' There are two other national societies in the United States having similar objects; also 30 state and numerous local societies and clubs. There are 28 general and 33 special hospitals, 43 dispensaries, 23 medical journals, 16 medical colleges, and about 8,000 physicians, who practice in whole or in part after this method.

The patrons of homœopathic practice are among the intelligent and cultivated classes, hence any statistics derived from private practice would be likely to be favorable to this practice.

HOMŒOPATHY.

It is claimed that the records of hospitals, prisons, and almshouses, where the two prevailing systems have been tried side by side under conditions as nearly equal as it is possible to make them, show a decided advantage in favor of homœopathic practice, both as regards the time of sickness and the rate of mortality. It is claimed also that the statistics of yellow fever in the southern states are strongly in favor of homœopathic practice. On the other side, however, credit is not given to these statistics.

The number of physicians who *avowedly* practice homœopathy has not greatly increased of late; but its adherents claim that the *actual* practice of it has been greatly augmented. In proof of this they point to the more recent text-books in medicine, published by the teachers of the dominant school; and to the recognition of the value of small doses of aconite in inflammatory fevers, arsenic in gastritis, ipecacuanha (in one-drop doses) in vomiting, etc.

The objections entertained by physicians generally to the so-called 'homœopathic' practice of medicine are based, not on any unwillingness to employ medicines whose action resembles more or less the features of the disease for which they are prescribed, but solely on the impossibility, according to the common view, of adopting this as a specific rule of practice, and especially as an exclusive and all-embracing law of therapeutics. The action of emetics in some kinds of indigestion, and of rhubarb in some kinds of diarrhœa, are familiar examples in daily use, showing that ordinary practice is not regulated by any blind prejudice against what is called the homœopathic law of '*similia similibus curantur;*' but in these cases the physician does not in the least commit himself either in favor of or against the law, but rather sets it aside as a metaphysical abstraction, having nothing to do with the real principle of the cure, which, he claims, is to be found in common sense and experience, applied to the facts of individual cases and groups of cases. Physicians disavowing homœopathy especially disown as a nickname the title *allopathist*, invented for them by Hahnemann. It is stated that Hahnemann's alleged 'provings' have been rejected as in great part visionary by the great majority of those who have attempted to ascertain personally the effect of the same remedies; and to Hahnemann himself is ascribed the admission of the general aggravation of diseases by homœopathic doses when administered in sensible quantities, and the admission that the system of infinitesimal doses was with him simply a last refuge from the contradictory character of the results obtained under the earlier trials of remedies devised according to his assumed principle. The argument of physicians in general has been that the principle was false, and that the infinitesimal doses are its *reductio ad absurdum*. They admit freely that homœopathy has in some instances done good, by illustrating the spontaneous cure of disease, and correcting a blind faith in heroic remedies, but though individual converts of much local credit have here and there been made there is no movement in the profession toward adopting homœopathy as a system.

HOMŒOZOIC, a. *hō'mē-ō-zō'ĭk*, or HOMOIOZOIC, a. *-hō'-moy-ō-zō'ĭk* [Gr. *homoios*, similar; *zōē*, life]: applied to zones or latitudes, both of sea and land, which are characterized by the same forms of life.

HOMOGAMOUS, a. *hō-mŏg'ă-mŭs* [Gr. *homŏgămos*, married together—from *homos*, the same, similar; *gamos*, marriage]: in *bot.*, applied to composite plants having the flowers of the capitula all hermaphrodite. HOMOGAMIA, n. *hō'mō-gā'mĭ-ă*, or HOMOGAMY, n. *hō-mŏg'ă-mĭ*, in *bot.*, applied to the condition of plants when both parts of a generation are formed in a hermaphrodite flower exactly at the same period.

HOMOGANGLIATE, a. *hō'mō-găng'glĭ-at* [Gr. *homos*, like; *ganglion*, a knot, a little tumor]: in *zool.*, having a nervous system in which the ganglia are symmetrically arranged. HOMOGANGLIATA, name given by Owen to the *Articulata* of Cuvier, in accordance with a belief in the great importance of the nervous system as a basis of zoological classification. Each segment in the lowest H. contains a pair of ganglia with nerves proceeding from them; all, however, communicating by nervous filaments, and constituting a continuous chain. In the higher forms, there is greater concentration, and more evident allotment of the ganglia of particular segments to particular functions.

HOMOGENEOUS, a. *hō'mō-jē'nē-ŭs* [Gr. *homos*, same, like; *gĕnŏs*, kind]: of the same kind or nature; consisting of similar constituent elements; having a uniform structure or substance—opposed to *heterogeneous*. HO'MOGE'NEOUSNESS, n. *-nĕs*, or HO'MOGENE'ITY, n. *-jē-nē'ĭ-tĭ*, sameness of kind or nature; uniformity of structure or material.

HOMOGRAPH, n. *hŏm'o-grăf* [Gr. *homos*, same; *graphō*, I write]: in *milit.*, system of telegraphic signals by means of a white pocket-handkerchief; in *philol.*, a word which has exactly the same form as another, but is of different origin and meaning, as *fair*, the noun, a market; *fair*, the adjective, handsome. HOMOGRAPH'IC, a. *-ĭk*, in *geom.*, term applied to two figures so related that to any point in one only one point in the other corresponds, and *vice versa;* while to points situated in a line in either correspond collinear points in the other; also to rows of points, pencils of light, etc.; in *orthog.*, employing the same character always to represent the same sound. HOMOGRAPHY, n. *hŏm-ŏg'ra-fĭ*, in *orthog.*, the representation of each distinct sound by a distinctive character employed for that sound only.

HOMOIOPTOTON, n. *hŏm-oy-ŏp'to-tŏn* [Gr. *homoioptōtos*—from *homoios*, like; *ptōtos*, falling]: in *rhet.*, figure of speech in which the several parts of a sentence end with the same case or a term of like sound.

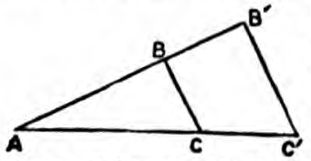
HOMOIOUSIAN, n. *hō'mŏy-ô'zĭ-ăn* [Gr. *homoiou'sĭŏs*, of like or similar substance—from *homoi'os*, like; *ousĭă*, substance, being]: in *eccles. hist.*, one who held that the Son was of *like* essence with the Father, and not of the *same* essence: ADJ. pertaining to. HOMOOUSIAN, n. *hō'mō-ô'zĭ-ăn* [Gr. *homŏou'sĭŏs*, being of the same essence or substance—

from *homos*, the same; *ou'sĭă*, essence, being]: one who maintained that the Son had the same essence with the Father. These two terms long distracted the primitive church. The first was the shibboleth of orthodoxy in the Arian controversy, according to the decree of the council of Nice, which declared the Son to be *homoousian*, of the same substance with the Father. The rigid Arians, who resisted the decree of Nice, rejected the term. The semi-Arians, who held the subordination of the Son to the Father, were divided as to its use. Some of them rejected the word altogether, as directly conveying a false idea; others, not absolutely rejecting the idea, regarded the word as objectionable, but rather as liable to misinterpretation, than as absolutely false. Both parties argued against its use from a decree of the council at Antioch 269, against Paul of Samosata, in which the name homoousian, as applied to the Son, was expressly condemned. They contended, therefore, that the Fathers of Nice had erred in applying it, and they proposed to substitute for it the term *Homoiousian* (of a like, i.e., a similar but not identical substance with the Father). Without entering into the doctrinal controversy, it suffices to say that the term, as used by the council of Antioch, bore a very different signification from that which the Fathers of Nice attached to it. In the controversy with Paul of Samosata who, with the Sabellians, held that the Father and the Son have but one and the same person, the word *ousia* was employed to signify personality. Hence, when the council condemned the doctrine of Paul, that the Son is homoousian with the Father, it merely declared that the Father and the Son are not one and the same person. On the contrary, the council of Nice, in defining that the Father and Son are homoousian, understand *ousia* in the very different signification of substance or nature. See the historical treatises of Athanasius, Newman's translation.

HOMOLOGATE, v. *hō-mŏl'ō-gāt* [Gr. *homŏlŏgos*, using the same words, of the same opinion—from *homos*, like; *logos*, a word]: to approve; to allow. HOMOL'OGATING, imp. HOMOL'OGATED, pp. HOMOLOGATION, Scotch law term, denoting an act or conduct which confirms or approves of something which otherwise might be invalid. The term is not used in English law, but similar effects are produced, and bear other names, such as confirmation, estoppel, part performance.

HOMOLOGOUMENA, n. *hŏm-o-lo-gô'mĕn-a* [Gr. *homologoumena*, things granted; *homologeō*, I speak the same language, I agree with]: in *scrip. canon*, term used by Eusebius of Nicomedia regarding those books of the New Testament the evidence for the genuineness and authenticity of which was deemed so strong that they were accepted at once, or at least without lengthened inquiry. The books thus designated were the four gospels, the Acts of the Apostles, thirteen of the Epistles of St. Paul (that to the Hebrews not being one), I John and I Peter.

HOMOLOGOUS, a. *hō-mŏl'ō-gŭs* [Gr. *homŏlŏgŏs*, assenting, agreeing—from *homos*, the same, like; *logos*, speech]: having the same ratio or proportion; constructed on the same plan, though differing in form and function. *Homologous quantities* or magnitudes in geometry are such as correspond, or are like to one another. For example, in similar triangles, the homologous sides are those which are opposite to corresponding angles. In the triangles ABC, AB′C′, which are similar, BC is homologous to B′C′, AB to AB′, and AC to AC′. Homol′ogy, n. *-o-jĭ*, affinity dependent on structure or the essential correspondence of parts; in the doctrine of the corresponding relations of parts, different beings, having the same relations but different functions. Homology, in *anat.*, indicates structural correspondence, while the term *analogy* indicates functional resemblance. Thus, by homologue (q.v.) is implied 'the same organ in different animals, under every variety of form and function;' while by analogue we understand 'a part or organ in one animal which has the same functions as another part or organ in a different animal.' For example, the wings of an insect are the analogues of those of a bat or bird, but not the homologues; while the latter are homologues with the arms of man, the fore-legs of quadrupeds, and the pectoral fins of fishes. For further illustration, see Owen *On the Archetype and Homologues of the Skeleton.* Homology, in *chem.* denotes agreement of composition or structure in organic bodies; members in a homologous series differ by the presence or absence of certain organic radicals: see Boiling—Boiling-Point. Homological, a. *hō′mō-lŏj′ĭ-kăl*, pertaining to homology. Ho′mological′ly, ad. *-lĭ*.



HOMOLOGUE, n. *hŏm′ō-lŏg* [Gr. *homos*, same, similar; *logos*, discourse, proportion]: correspondence or equivalence of certain organs; the same part or organ in so far as regards its anatomical relation, although differing in form and functions: see Homology.

HOMOMORPHY, n. *hō′mō-mŏr′fĭ* [Gr. *homos*, like, similar; *morphē*, shape, form]: in *bot.*, the condition of the Compositæ when the disk florets assume the form of ray florets; the fertilization of the pistil by the pollen from its own flowers; self-fertilization. Homomorphic, a. *hō′mō-mŏr′fĭk*, having the pistil fertilized by the pollen from its own flowers. Homomorphous, a. *hō′mō-mŏr′fŭs*, in *zool.*, having a similar external appearance or form.

HOMONYM, n. *hŏm′ō-nĭm* [Gr. *homōnŭmŏs*, having the same name—from *homos*, like; *onŭmă*, or *ŏnŏmă*, a name]: a word, the same in sound but different in signification. Homonymous, a. *hō-mŏn′ĭ-mŭs*, having different significations; equivocal; ambiguous. Homon′ymously, ad. *-lĭ*. Homon′ymy, n. *-ĭ-mĭ*, sameness in name, with difference in signification; ambiguity.

HOMOOMEROUS, a. *hō′mō-ŏm′ėr-ŭs* [Gr. *homoios*, like, similar; *meros*, a part]: in *bot.*, applied to lichens where the gonidia and hyphæ in the thallus appear about equally mingled.

HOMOOUSIAN: see Homoiousian.

HOMOPETALOUS, a. *hō'mō-pĕt'ă-lŭs* [Gr. *homos*, like; *petălŏn*, a petal]: in *bot.*, having all the petals formed alike; having all the florets alike in a composite flower.

HOMOPHONE, n. *hŏm'ō-fōn* [Gr. *homos*, like; *phonē*, sound]: a letter or character having the same sound as another. Homophonous, a. *hō-mŏf'ŏ-nŭs*, having the same sound; of the same pitch. Homoph'ony, n. *-nĭ*, sameness of sound.

HOMOPLASMY, n. *hō'mō-plăz'mĭ* [Gr. *homos*, similar; *plasma*, anything formed]: in *bot.*, the phenomenon of the resemblance in odors of different orders of plants.

HOMOPTERA, *hō-mŏp'tėr-a* [Gr. *homos*, the same, uniform, *pteron*, wing]: according to some entomologists, an order of insects; according to others, one of the two great divisions of the order *Hemiptera* (q.v.), differing from the *Heteroptera* in having the first pair of wings of uniform substance throughout (whether perfectly membranous, or somewhat leathery, and so passing into elytra), and the rostrum or sucker originating from the inferior part of the head near the thorax, or even between the first pair of legs. The H. feed on the juices of plants, and some of them are very troublesome to farmers and gardeners. The females of many have an *ovipositor*, by means of which they pierce plants, to make a place for the reception of their eggs. The larvæ are active, and resemble the perfect insect, but are wingless. The pupæ also are active, and have rudimentary wings. Among the H. are Cicadas, the largest of the order, Lantern-flies, Froth-hoppers, Aphides, and the Coccus tribe.

HOMOTAXIS, n. *hŏm'ō-tăks'ĭs* [Gr. *homos*, similar; *taxis*, arrangement, position]: in *geol.*, a term applied to strata occupying the same place or position in the stratified systems, but which may, or may not, be contemporaneous. Homotaxeous, a. *hŏm'ō-tăks'ĕ-ŭs*, that may, or may not, be contemporaneous; also Homotaxial, a. *hŏm'ō-tăks'ĭ-ăl*, same sense.

HOMOTONY, n. *hŏm-ŏt'o-nĭ* [L. *homotonos*—from Gr. *homos*, same; *tonos*, tone]: the act or state of keeping to the same tone; monotony. Homot'onous, a. *-nŭs*, of the same tenor or tone; equable; applied to such diseases as keep a constant tenor of rise, state and declension.

HOMOTROPAL, a. *hō-mŏt'rŏ-păl* [Gr. *homos*, like; *tropē*, a turning]: in *bot.*, having the same general direction as a body of which it forms a part; applied to the slightly curved embryo when it has the same general direction as the seed.

HOMOTYPE, n. *hō'mō-tīp* [Gr. *homos*, like, similar; *tupos*, form, a type]: that part of an animal which corresponds to another part; correspondence of parts which lie in series, as the bones of the foot with those of the hand. Homotypy, n. *hō-mŏt'ĭ-pĭ*, the state or condition of such correspondence. **Homotypic**, a. *hō'mō-tĭp'ĭk*, pertaining to; homologous.

HOMS, or **Hums**: see **Hems**.

HOMUNCIONITE, n. *hŏm-ŭn'sĭ-on-īt* [L. *homuncio*, a little man, a manikin; dimin. of *homo*]: in *eccles. and chh. hist.*, one of the followers of Photinus, Bp. of Sirmium, who, 343, maintained that only the Father was a divine personality, that the Word of God was His understanding, and the Holy Spirit one of His attributes. Jesus he believed to have been a mere man, adopted by God as a son on account of his pre-eminent virtue and piety. After being censured by the councils of Antioch, Milan, and two councils at Sirmium, the last under Arian management, he was finally deposed from his office, dying 372.

HONAN, *hō-nân'*: one of the central provinces of China; 66,900 sq. m.; pop. 29,069,771. Its capital, Kaifung-fu, is on the Yellow river, from which it has often suffered, the river-bed being here elevated above the adjacent country. It has been overflowed nineteen times. In the reign of Fuhi (B.C. 2852), it was the cap. of China. It has suffered various vicissitudes. In the 12th c. after Christ, it was six leagues in circumference. At present, the city is uninteresting to Europeans, except as the residence of the Jews of China, now dwindled to a few families.

HONAWAR, *hŏn-a-wâr'*: seaport on the Malabar or w. coast of the peninsula of Hindustan; in the dist. of Kanara (north) or Honawar, presidency of Bombay; lat. 14° 17′ n., and long. 74° 30′ e., 340 m. s.e. of Bombay. It stands on the n. side of an inlet of the Arabian Sea, which receives the Gerseppa or Sheravatti from the Western Ghauts. Though both the harbor and the anchorage outside have a good bottom and sufficient depth, yet, in the season of the s.w. monsoon, the surf is a serious impediment to navigation. Pop. 6,000.

HONDO, *hŏn'dō*, or **Honshin**, *hŏn'shĭn*: largest island of Japan; often improperly called Nipon or Niphon: see (correctly) Nippon.

HONDURAS, n. *hŏn-dū'ras*: kind of mahogany brought from Honduras.

HONDURAS, *hŏn-dô'ras*: one of the 5 republics of Central America: lat. 13° 10′—16° 5′ n.; bounded by the Caribbean Sea, Nicaragua, Bay of Fonseca, San Salvador, and Guatemala; 39,600 sq. m. Pop. (1887, June) 331,917, of whom 325,750 were natives.

The country generally is mountainous, being traversed by the Cordilleras, which connect the Andes on the s. with the Sierra Madre on the n.; is watered chiefly by the Segovia, Patuca, Guayape, Ulna, and Santiago rivers: has safe and commodious harbors at Omoa, Trujillo, and Puerto Cortez on the Caribbean Sea, and Amapala on the Pacific coast; and abounds in gold, silver, copper, iron, cinnabar, zinc, antimony, tin, platinum, opal, amethysts, asbestos, chalk, limestone, marble, and coal. H. is also a rich agricultural region, the soil yielding much valuable timber, fruit, cotton, sugar, coffee, tobacco, indigo, maize, wheat, potatoes, yams, plantains, bananas, and beans. The climate is healthful in the highlands, but miasmatic on the coast.

The foreign trade is chiefly with the United States, Great Britain, and Spain, and the volume of recent trade with the United States was: Export, (1886) $730,559; (1887) $857,919; (1888) $957,331; import, (1886) $428,104; (1887) $425,741; (1888) $672,796. The principal exports are bullion, indigo, cattle, timber, hides, and tobacco; cotton and silk fabrics are imported from England, and large quantities of cutlery and machinery from the United States. The national debt is composed of the outstanding remainder of the French loan of 1869 ($25,000,000), and home debt, $700,000, and floating debt, $200,000 (1887). The govt. made contracts 1888 for the establishment of a national bank and the Banco Centro-Americano, both at Tegucigalpa and with large privileges. Since 1884 the development of the country has been rapid, through a liberal progressive administration, and capital and enterprise from the United States. The H. North Coast railroad now being built by Boston and New Orleans capital under a 99-years' concession granted 1884, July, will be 150 m. long with termini at Trujillo and Puerto Cortez; the 38 m. road from Puerto Cortez—a portion of the projected trans-isthmian route to Fonseca Bay—is being completed by a London syndicate; and a third line, from Trujillo to Fonseca Bay, which will traverse the great mining region, is being built (1889) by New York capitalists. A canal is being constructed by a New York company to connect the Bay of Fonseca with the Aguan river, and contracts were signed 1888, Sep., for the establishment of a steamship line between the coast and bay islands. The government is equally alert to secure the development of the great mineral resources of the country, and under its liberal concessions (with several outright gifts) 18 foreign mining companies were at work (1889), a New York and Philadelphia syndicate alone controlling 15 of the richest mines in the country. Secular schools have been founded recently in all the towns and villages, and are supported by municipal taxes with some govt. assistance. Education is compulsory and free. The Acad. of Science and Literature of H. was founded at the capital 1888, Sep. 15, where there are also an institute of technology and medical and legal colleges. Besides these there are six colleges in the country. The educational system is modelled after that of the United States. The govt. offers the immigrant land to cultivate, and adds an acre to every acre that he puts under cultivation. It also supplies him with implements and machinery of the latest pattern, to be paid for out of the profits of the farm. The colonist is, moreover, exempt from all taxation and military service; and this immunity is extended to all the natives that he may employ while actually in his service. In diplomacy H. ratified the treaty of commerce and navigation with Great Britain signed a year previously, 1888, Jan.; and at the same time a similar one with Germany; and one of friendship between the 5 Central American republics 1887, Feb. 16.

H. was discovered by Columbus 1502, Aug. 14, conquered by Cortez 1526, flourished greatly under the Spaniards, joined the Central American confederation 1823, established itself as an independent republic 1839, suffered many years from political revolutions, and adopted its present constitution 1880, Nov. 1. Old cap. Comayagua; present cap. Tegucigalpa, with pop. (1888) 15,000.

HONDU'RAS, BAY OF: inlet of the Caribbean Sea, between Yucatan and Guatemala on the w., and Honduras on the s. From the adjacent countries of British Honduras and Yucatan it receives numerous streams, the chief of which is the Balize, and comprises several islands. The shore is marked by reefs.

HONDU'RAS, BRITISH: see BALIZE.

HONE, *hōn* [Sw. *hjon;* Icel. *hein*, a hone; W. *hoji*, to incite, to sharpen]: a stone of a fine grain used for sharpening cutting instruments: V. to sharpen on a hone. HO'NING, imp. HONED, pp. *hōnd.—Hones* or WHETSTONES, are a particular class of stones used for sharpening edge-tools, such as knives, scythes, etc. They are usually cut into pieces about a foot in length, and from an inch to two inches thick, and either left square or rounded, according to their intended uses. The finest kind of hones are called oil-stones; these are hard, compact, and so very silicious that they readily wear down the hardest steel; they are varieties of slate, derived from the argillaceous schists of the Palæozoic period. The best are from Turkey; Bohemia also is noted for its hones; and excellent ones are found in Persia, in the Harz Mountains, in Styria, in America, Great Britain, Spain, Peru, and Siberia. The whetstones for sharpening scythes, etc., are usually of coarse-grained sandstone.

HONE, *hōn*, WILLIAM: English author: 1780, June 3—1842, Nov. 8; b. Bath. He published a number of clever political satires, *Ancient Mysteries Described*, an edition of Strutt's *Sports and Pastimes*, etc.; but is best known by his *Every-Day Book* (1826–7), his *Table Book* (1827–8), and his *Year Book* (1829), three publications which contain much curious and useful information, and which have been more than once imitated. He was arrested and repeatedly tried for his biting satires on govt. officials (illustrated by Cruikshank): in each case he was acquitted amid demonstrations of great popular enthusiasm. In his later years he became very devout, and frequently preached in Weigh House Chapel, Eastcheap. He died at Tottenham.

HONESDALE, *hōnz'dāl:* flourishing borough in the n.e. of Pennsylvania, 124 m. from Harrisburg. It is at the confluence of the Lackawaxen and Dyberry creeks, and connected by canal and railway with New York. It is the centre of a coal-district. It contains a foundry, tanneries, glass-works, mills, two newspapers, etc. Pop. (1880) 2,620.

HONEST, a. *ŏn'ĕst* [OF. *honeste*—from L. *hones'tus*, honorable—from *honos*, honor: It. *onesto;* F. *honnête*]: fair in dealing with others; just; frank; hearty; sincere.

HON'ESTLY, ad. *-lĭ*, uprightly; justly. HON'ESTY, n. *-tĭ*, upright conduct or disposition; fairness in dealing with others.—SYN. of 'honest': upright; true; chaste; just; righteous; creditable; honorable; open; well-looking; jolly; trusty; faithful; equitable; rightful; frank; candid; fair;—of 'honesty': sincerity; integrity; probity; uprightness; honor; justice; equity; candor; veracity.

HONESTY, *ŏn'ĕs-tĭ* (*Lunaria*): genus of plants of nat. ord. *Cruciferæ*, of which two species, natives of s. Europe, *L. annua* or *biennis*, and *L. rediviva*, have long been cultivated in flower-gardens of countries farther north, partly for the beauty of their flowers, and partly for the curious appearance of their large flat seed-pouches (*silicules*). The origin of the English name is doubtful. Some of the older English poets mention the plant as *Lunarie*. It was regarded, in the days of superstition, as possessing extraordinary virtues.

HONEY, n. *hŭn'ĭ* [Dut. and Ger. *honig;* Icel. *hunang;* AS. *hunig*]: the sweet substance collected by bees; sweetness. HONEYED, or HONIED, a. *hŭn'ĭd*, sweetened in a figurative sense, as *honeyed words;* sweet; luscious. HON'EYLESS, a. without honey. HONEYCOMB, n. the wax cells containing the honey—so named from a fancied resemblance to a comb. HONEYCOMBS, in *guns*, flaws resembling cells made by bees: they are worked in the metal by the action of exploded gunpowder, spread rapidly, and by continuous firing soon render the gun dangerous. HONEYCOMBED, a. *-kōmd*, applicable to any surface having small irregular punctures spread over it, like the cells of the honeycomb—we even speak of a mountain as honeycombed with caverns. HON'EYMOON, n. the first month after marriage. HONEY-MOUTHED, soft or smooth in speech. HONEY-STALKS, in *OE.*, clover and their stalks. HONEY-TONGUED, fair and smooth of speech. *Note.*—The primary meaning of HONEYMOON, appears to have been 'the first period of prosperity and enjoyment in any business or undertaking': see next entry, and Dr. C. Mackay.

HONEY, n. *hŭn'ĭ*, or HINNEY, n. *hĭn'nĭ* [Gael. *ionmhuin*, dearly beloved: Bret. *inni*, a woman, a girl]: in *familiar language*, a term of endearment among the Irish and Scotch—applied to a girl or woman; in *N. of Eng.*, applied to both sexes. HON'EYING, n. in *OE.*, making love.

HON'EY: sweet substance secreted by the nectariferous glands of flowers, whence it is collected by the working or neuter bees, which extract it by means of the proboscis, and pass it into the dilatation of the œsophagus, known as the crop or honey-bag. When the animal has arrived at the hive, it disgorges the honey, probably altered by admixture with the secretion of the crop, into the cells of the comb. It is used by the bees as food.

The composition of H. varies somewhat according to the food of the bees, their age, the season, etc. Hybla, mountain in Sicily, and Hymettus, mountain in Attica, were in ancient times celebrated for their H.; doubtless in consequence of the wild thyme and other fragrant herbs growing on them. The H. of Narbonne and Chamouni is now held in high estimation for similar reasons; and in Britain, H. obtained by bees having access to heather has a peculiarly agreeable taste. The substances which have been recognized in H. are sugar of two kinds—one crystallizable and analogous to glucose (q.v.), and the other uncrystallizable, mannite (according to Guibourt); gummy, waxy, coloring, and odorous matters; and pollen. The proportion of crystallizable sugar increases with the age of the H., so as to give it in time a granular character. The best and newest H. is a clear fluid contained in a white comb, while older honey is of yellowish, and even reddish tint.

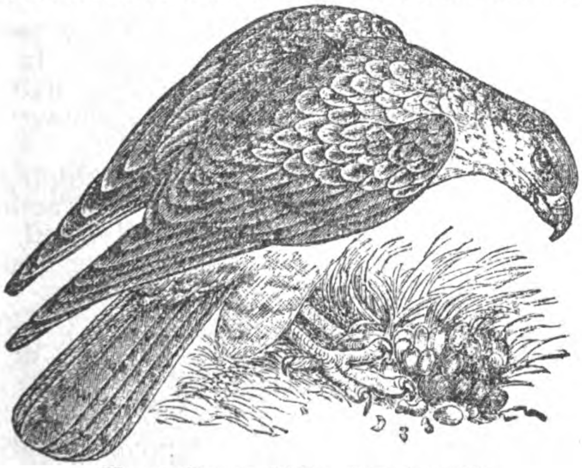
From the remotest times, honey has been employed as food; and to the ancients, unacquainted with sugar, it was of more importance than it now is. 'A land flowing with milk and honey' offered the highest conceivable advantages to the eastern mind. Taken in moderate quantity, H, is nutritive and laxative, but dyspeptic persons often find that it aggravates their symptoms. Its therapeutic action is probably not very great, but it is employed with advantage to flavor and give a demulcent character to various drinks or mixtures prescribed for allaying cough; and in the form of *oxymel*, prepared usually by mixing H., acetic acid, and water, it is frequently added to gargles, or mixed with barley-water, to form an agreeable cooling drink in febrile and inflammatory affections, or given as an expectorant in coughs and colds.

H. occasionally possesses very deleterious properties. Xenophon, in his history of the Retreat of the Ten Thousand (*Anabasis*, book iv.), describes the H. of Trebizond as having produced the effect of temporary madness, or rather drunkenness on the whole army who ate of it. Mr. Abbot, writing from Trebizond 1833 to the sec. of the Zoological Society, London, observes that he has himself witnessed that the effects of this H. are still precisely the same as those which Xenophon describes, and he adopts the views propounded by Tournefort 1704, that the poisonous properties are consequent on the bees extracting the H. from the *Azalea Pontica.* Many other instances of poisonous H. are on record.

H., though not of so much importance commercially as before sugar became so abundant, is nevertheless a considerable article of traffic. The French H. is very fine, and is used chiefly for domestic and medicinal purposes; the Greek is the finest, and is a table delicacy; most of the other kinds are inferior, and excepting some portion used by the tobacco manufacturers, to give spurious sweetness, it is difficult to account for the quantity consumed. It is often much adulterated. One of the most common materials of adulteration is flour; samples of French H. have been found largely adulterated with gelatine; the latter cannot so easily be detected, as there is always present naturally a portion of gelatine in honey. The quality of even the best depends upon its careful refinement or clarifying. If H. be slightly heated, the chief impurities rise to the surface, and can easily be removed by skimming; this is usually done, except in the case of virgin H. which is generally sufficiently pure for most purposes.

The United States has facilities for producing an almost unlimited quantity of H. of the finest quality. In 1881 the yield was reported as 138,000,000 pounds and it has steadily increased. Large quantities are exported and the demand, foreign and domestic, constantly exceeds the production. By the invention of movable frame hives by the Rev. L. L. Langstroth, 1851, an impetus was given to the business of bee-keeping. In 1861 Italian bees were introduced with great benefit to producers of H., and at a later period the Syrian and Cyprian bees were imported. The latter are more prolific than the Italian, but are not as easily managed. A cross between the Italian and Syrian promises to give the best breed which it is possible to obtain. In 1877 the 'artificial honey-comb foundation' was introduced and greatly stimulated the production of H. Another great improvement is the use of the H.-extractor, a machine which removes the H. without damage to the combs and gives a much purer and better quality than could be obtained by the old method of crushing and straining. After the H. is removed, the combs are put in the hives to be re-filled. Bees should be protected from storms and winds and from extremes of heat and cold. If there is no stream near the hives water should be supplied. H.-producing plants, as white clover, mustard, catnip, and buckwheat, should be grown, and linden and locust trees may be put out with advantage in districts where many bees are kept. If the H. is extracted often, the bees will keep collecting new stores and will swarm less frequently than they will if the combs are allowed to remain filled. In cold regions bees must be protected during the winter in a ventilated room or cellar where the temperature will not fall below 40 degrees. About 35 pounds of H. should be left in each hive for food.

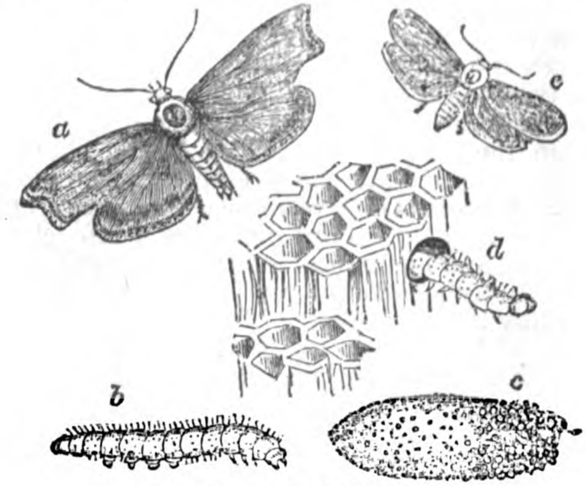
HON'EY BUZ'ZARD, or PERN (*Pernis*): genus of *Falconidæ*, allied to kites and buzzards, but differing from



Honey Buzzard (*Pernis apivorus*).

them, and from all other *Falconidæ*, in having the *lore*, or space between the eye and the bill, closely covered with feathers, which overlap one another like scales. The food of honey buzzards consists, not of honey, but chiefly of bees, wasps, and their young, in quest of which these birds dig up the ground, to get at the nests of the insects. They feed also partly on other insects, and less frequently on lizards, small birds, etc.

HONEYCOMB MOTH, or WAX MOTH (*Galleria*): genus of small moths of the same tribe with clothes' moths, of which some species are remarkable for infesting bee-hives. There they deposit their eggs; and the larvæ feed on the honey-comb, through which they make tunnels lined with silk, and in the midst of which they finally spin their cocoons and undergo their transformations. The cocoons are often united in little heaps. These moths, when numerous, are very injurious, and sometimes quite destructive to the bees, from whose stings they seem to have perfect immunity. *G. mellonella* or *cereana*, perhaps the most destructive species, is about an inch in extent of wings; *G. alvearia* not much more than half an inch. Both have a satiny appearance, and are among the worst enemies of the bee-keeper.



Honey-comb Moth:
a, Galleria mellonella; *b*, larva; *c*, pupa; *d*, larva working its way through honey-comb; *e*, Galleria alvearia.

HONEY-COMBS, in Guns: flaws resembling the cells made by bees, worked in the metal by the action of exploded gunpowder. They spread rapidly, and, with continuous firing, soon eat into the metal to such an extent as to render the further use of the gun dangerous.

HON'EY-DEW: viscid saccharine exudation often found in warm dry weather on the leaves and stems of trees and herbaceous plants. It is usually, but not always associated with the presence of *Aphides*, *Cocci*, and other insects which feed on the juices of plants, and its flow is ascribed to their punctures; but the rupture of the tissues from any other cause, such as the state of the weather, also seems to produce it, and warm dry weather seems necessary for production in the sap of that superabundance of sugar which is thus thrown off. Aphides themselves exude by certain peculiar organs (see APHIS) drops of a fluid called H.-D., which probably differs considerably from the direct exudation of the plants on which they feed, but mingles with it where they abound. H.-D. is often so abundant as to fall in drops from one leaf to another on to the ground, sometimes falling from trees even as a copious shower. Different kinds of manna are the dried H.-D. or saccharine exudation of certain plants: see MANNA. But very generally, this exudation, as it dries, coats the surface of leaves and branches with a clammy film, to which everything brought by the atmosphere adheres, and on which molds and other small fungi soon grow, and thus the pores of the plant are clogged and its health is impaired. Gardeners are therefore careful to wash off H.-D. with the syringe. Orange and lemon plantations sometimes suffer great injury from the abundance of H.-D.; and it has caused very great loss in the coffee-plantations of Ceylon.

HON'EY-EAT'ER, or HON'EY-SUCK'ER: name sometimes given to some of the Sun-birds (q.v.), but also the common name of a large family of birds nearly allied to these and to humming-birds, and peculiar to Australia and the islands of that part of the world. This family, *Meliphagidæ*—of order *Insessores*, and tribe *Tenuirostres*—has a long curved sharp bill, not so slender as in humming-birds and sun-birds; the tongue terminates in a pencil of delicate filaments, the better to adapt it for sucking honey from flowers, or juices from fruits. These are a principal part of the food of the honey-eaters, but they devour insects also in great numbers. They are birds of elegant form,

New Holland Honey-Eater (*Meliphaga Novæ Hollandiæ*).

and generally of gay plumage. Most of them have a long and broad tail. They may be observed fluttering and darting among trees and shrubs when in blossom, and are very abundant in all parts of Australia. They are extremely vivacious and active, and keep up a continual chattering. One of the most splendid species, *Meliphaga* or *Ptiloris paradiseus*, is called the Rifleman or Rifle Bird by the Australian colonists. Another species, *Myzantha melanophrys*, is called the Bell Bird, because its voice much resembles the tinkling of a little bell. To this family is referred the Poe Bird, Parson Bird, or Tui-tui (*Prosthemodera Novæ-Zeelandiæ*) of New Zealand, a bird larger than a blackbird, and of deep metallic green color, becoming bronze and black in certain lights, with snow-white tufts of downy curling feathers on the sides of the neck. Unlike most of the *Meliphagidæ*, it is a bird of fine song. It has also great powers as a mocking-bird, readily learns to speak many words, and becomes very familiar in domestication.

HON'EY-GUIDE, or **In'dicator**, or **Moroc** (*Indicator*): genus of birds ranked in the Cuckoo family, but differing from the true cuckoos in characters which show approach to woodpeckers, also, in some respects, to creepers. They all are natives of Africa, and are found in almost all parts of it. They have acquired their name from guiding men to honey; a curious instinct prompting them to flutter near the traveller with frequent repetitions of a cry which resembles the syllable *cherr;* and it is said that, if followed, they almost always lead to a place where a bees' nest may be found.

HON'EY-LO'CUST TREE (*Gleditschia triacanthos*)—known also as the Sweet Locust, and Black Locust, and in Britain as the Three-thorned Acacia: lofty and beautiful tree of nat. ord. *Leguminosæ*, sub-ord. *Cæsalpinieæ*, native of the valleys of the Alleghanies, and of the basin of the Mississippi. It is not found wild on the Atlantic coast of N. America, though often planted for ornament near dwellings. The flowers — small, greenish, and in spikes—have, when perfect, six stamens and one pistil, but are generally unisexual. The leaves are twice pinnate, without terminal leaflets, the numerous small leaflets giving peculiar gracefulness to the foliage, which is of light shining green. The tree is furnished with numerous sharp spines. The pods are long, flat, pendulous, often twisted; the seeds are large, brown, and enveloped in a pulp, which, when the pod is ripe, is very sweet. Sugar has been made from it, and when fermented, it yields an intoxicating beverage, in use among the American Indians. The honey-locust attains a height of 70 or 80 ft. The wood resembles that of the American Locust Tree (q.v.), or False Acacia (*Robinia pseudacacia*), but is more coarse-grained.

HON'EY-STONE, or **Mel'lite**: mineral of remarkable characters and composition, found in connection with coal and sulphur in several places in Germany. It occurs in square octahedrons, looks like a honey-yellow resin, and may be cut with a knife. It is a mellate of alumina, consisting of mellic acid, alumina, and water.

HON'EYSUCK'LE (*Lonicĕra*, or, according to some botanists, *Caprifolium*, which others make a sub-genus of *L.*): genus of plants of nat. order *Caprifoliaceæ*. They are shrubs, often twining, and have the flowers either in whorls or in pairs. The calyx is short and 5-toothed; the corolla tubular-funnel-shaped, 5-cleft, generally two-lipped; the fruit a 3-celled and many-seeded berry.—The COMMON H., or WOODBINE (*L. periclymĕnum*), is abundant in woods and thickets, and on account of its beautiful cream-colored whorls of flowers and their delicious fragrance, it is often planted in shrubberies, and trained against walls. It is said to be the 'twisted eglantine' of Milton. The phenomena observed in its growth have been adduced in proof of a *perceptive power* in plants: the branches shooting out till they become unable to bear their own weight; and then, on their meeting with any other branch, twining around it, from right to left; but if they meet only with one another, twining in different directions, one to the right and another to the left.—Very similar to this is the PERFOLIATE H. (*L. caprifolium*), with paler whorls of flowers, and remarkable for having the upper leaves united so that an opposite pair form one leaf, through the middle of which the stem passes. This peculiarity is confined to the flower-bearing shoots, and does not occur on the young runners; it is also most perfect nearest the flower. This species is a native of s. Europe, but now naturalized in many parts of Britain, and much planted, as though less fragrant than the common H., it flowers earlier.—There are numerous other species, natives of Europe, Siberia, and North America.—The FLY H. (*L. Xylosteum*) is an erect shrub, native of Europe and Asia. Its branches are frequently used in parts of Europe for tubes of tobacco-pipes; and it is said to make good hedges in dry soils. Other erect species are frequently planted in shrubberies.—The TRUMPET H. (*L. sempervirens*), called in the United States the CORAL H., is a native of the southern states, often planted in the north on account of its beautiful flowers, red on the outside, and scarlet within, which, however, have no fragrance. It is a twining evergreen shrub.—The berries of the honeysuckles are nauseous.—The name H. is given also to shrubs very different from this genus, but of which the flowers abound in honey, as to species of *Banksia* in Australia. *Azalea viscosa* is called Swamp H. in N. America.

HON'EYSUCK'LE, FRENCH: see FRENCH HONEYSUCKLE.

HON'EYSUCK'LE OR'NAMENT: form characteristic of eastern art. It is used in Assyrian, Persian, and Hindu architecture, and wherever used indicates an eastern origin. The Greeks borrowed it from the Persians, and, by refining and improving it made it one of the most beautiful ornaments of their architecture. It is used chiefly in the Ionic style (q.v.). See also GRECIAN ARCHITECTURE.

HONFLEUR, *ŏng-flėr'*: small town and seaport of France, dept of Calvados, on the s. shore of the estuary of the Seine, opposite to, and seven m. from the port of Havre. Its situation, backed by wooded heights is exceedingly pleasing; but it is badly built, dirty, and uninteresting. The commerce of H., once important, has been absorbed in great measure by Havre; many vessels, however, engaged in the fisheries, are still owned here, and there is considerable trade in export of eggs and fruit to England, and in timber. The principal manufactures are hosiery, chemical products, hardware, and refined sugar. There are also rope-walks and ship-building yards. The harbor is furnished with two light-houses. Pop. 9,200.

HONG, n. *hŏng* [Chinese, *hang*, or *hong*, row or series of shops or rooms, a mercantile house]: in *China*, the company of merchants who were alone privileged to deal with foreigners; the buildings used for offices or counting-houses; the place where sales and purchases are made.

HONG-KIANG' or WES'TERN RIVER: see SI-KIANG.

HONG-KONG, *hŏng-kŏng'* — properly HIANG-KIANG ('Fragrant Streams'): British island off the s.e. coast of China, in the estuary of the Chu-Kiang, about 75 m. s.e. of Canton. It is nine m. long, from two to six broad; about 29 sq. m. The cap., Victoria, lat 22° 16½' n., long. 114° 8½' e., had pop. (1872) abt. 90,000, of which nearly 6,000 were Europeans and Americans (comprising almost all of that race on the island). The total public income in 1879 was £200,822; the expenditure, £193,066.

The island is covered to the shore with mountains, the peaks ranging from 1,000 to nearly 2,000 ft. high. The mountains consist chiefly of granite, syenite, serpentine, and trap; granite quarries are skilfully worked by the Chinese. In the early years of the colony, when the ground was being broken up for building purposes, European settlers suffered much from febrile and other diseases, and the island had an unenviable reputation for unhealthfulness. Now, however, in this respect H. may compare favorably with any other British possession in the east. For about six months, from May to Oct., the heat is oppressive in the extreme, being accompanied with much rain and damp. During four of the winter months, the weather is cool, dry, bracing, sometimes even cold; but the change from the high and moist temperature of summer to a dry cold is apt to produce dangerous diseases, more especially of the kidneys. The temperature in summer ranges from 83° to 90°, and in winter from 40° to 75°. On the mainland, opposite the n. shore of the island, and separated from it by the harbor, which varies from half a m. to four m. in width, is the Kow-loong Peninsula, a strip of coast territory and portion of the township of the same name ceded to the British govt. by the convention of Pekin, 1861, Oct. 24.

Victoria the capital, is on the n. shore of the island, on a small bay surrounded by mountains. It is laid out in magnificent streets and terraces, and has abundant supply of good water from a large reservoir on the s. side of the island. The harbor is commodious and safe; the road-stead has a depth of 3 to 7 fathoms, and good anchorage At Aberdeen, on the s. side of the island, and at Kowloong, there are docks capable of taking the largest steamers. Between Victoria and Canton and Macao, communication by steam is obtained daily, and since the opening of the Suez canal the same may be said of Shanghai, Yokohama, Bombay, Calcutta, and Singapore, so that the magnificent harbor presents a most stirring appearance. In 1880, the imports from the United Kingdom were valued at £3,967,792; the exports from H. thither, £1,253,541. Here mercantile houses centralize their operations; yet H. occupies only a secondary rank in the commerce of China. The bulk of the merchandise from Europe goes direct to the place of its destination, without touching this port; in the same manner, teas and silks pass through H. only when it is a port of call for the steamers carrying them. The import trade of H. is chiefly in opium, in English cotton and woolen goods, and in metals, in repairing vessels, and in the transfer of passengers. One of the most flourishing of British colonies, H. is destined to further extension and importance, and will rise with the gradual increase of the commerce of e. Asia. A small species of deer is found on the island. Among reptiles there are several species of non-poisonous snakes, one species of the boa which reaches a length of eight or nine ft., and the cobra. Lizards also abound.

In 1843 this island was ceded in perpetuity to her Britannic majesty by the treaty of Nankin, having been occupied, as a preliminary measure, 1841. Its affairs are ruled by a gov. and legislative council. Pop. of H. (1841) 5,000; (1852) 37,058; (1876) 139,144; (1881) 155,730.

HONITON, *hŏn'ĭ-ton* or *hŭn'e-ton:* small market-town and municipal borough of England, county of Devon, beautifully situated in a graceful and highly cultivated valley, near the left bank of the Otter, 16 m. n.e. of Exeter. The old church contains a light and elegant oak-screen, erected 1482 by Courtenay, Bp. of Exeter. H. has long been famous for the lace, named from the town in which it is the chief branch of manufacture. It is made by hand on a *pillow:* its manufacture was introduced into England by the Lollards during the reign of Elizabeth. The vale of Honiton is noted for its butter. Pop. (1881) 3,349.

HONITON-LACE: see HONITON.

HONOLULU, *hŏn-o-lô'lô* or *hō-nō-lô'lô:* seaport, lat. 21° 18′ n., and long. 157° 55′ w., on the s.w. or leaward coast of Ooahu, one of the Sandwich Islands (q.v.); one of the very few spots in Polynesia that can fairly claim to be reckoned an integral part of the world of commerce and civilization. Being the seat of government, as well as the centre of trade, it is, in every sense, the metropolis of its own group, which is at once the largest and most important of all the kindred clusters. But beyond this, its intrinsic advantages, and the absence, or at least the distance, of rivals along the surrounding waters, in any direction, have combined to render it an entretpôt between the opposite shores of the Pacific. Besides attracting numbers of whalers for repairs and supplies, H. occupies a most convenient position on each of the three great thoroughfares of its own vast ocean. Though Ooahu, in common with the rest of the chain, is evidently of volcanic formation, yet the reef, which forms the breakwater of the harbor of H., is of coral formation. The temperature of the town ranges between 67°·9 in Jan., and 83°·2 in Aug.; so that, roughly computed, the annual mean is 75°·55, with a divergence in either direction of only 7°·65. The tropical heat is modified by periodical n.-easters. H. is visited annually by about 300 vessels of various sizes, many being whalers. This mart of traffic has, for 70 years, maintained the unity, and, through the unity, the peace of the once independent and hostile tribes of the Hawaiian archipelago. In H. are to be found consuls from the United States, Chili, Denmark, France, Great Britain, Germany, Russia, Sweden, Italy, Belgium, the Netherlands, Austria, and Peru. Pop. fully 20,000, of which natives are abt. nine-tenths; and the majority of the remainder naturalized immigrants from the United States.

HONOR, n. *ŏn'ėr* [OF. *honeur*—from L. *honōrem*, honor, respect: It. *onore;* F. *honneur*, honor: Gael. *onoir*, honor]: the esteem paid or due to worth; any expression of high respect; worship; high rank or place; civilities; dignity; fame; scorn of meanness, the result of self-respect; token of respect; chastity; glory; he who or that which honors: V. to respect highly; to treat with deference or submission; to raise to distinction or notice; in *commerce*, to accept and pay when due, as a bill of exchange. Hon'oring, imp. Honored, pp. *ŏn'ėrd.* Honorary, a. *ŏn'ėr-ă-rĭ*, intended merely to confer honor; unpaid. Honorable, a. *ŏn'ėr-ă-bl* [F. *honorable*—from L. *honorābĭlis*]: deserving or implying honor; high-minded: actuated by the principles of honor; of high rank in society; used as a title of rank or high office, as *right honorable* (see below): without taint or reproach. Honorable ordinaries, in *her.:* see Ordinaries. Hon'orably, ad. *-ă-blĭ*, with tokens of honor; generously. Hon'orableness, n. *-ă-bl-nĕs.* Hon'orless, a. without honor. Hon'ors, n. plu. privileges of rank or birth; public marks of respect or esteem; high academic distinctions; the highest cards held in the game. Military honors—Naval honors: see Salutes. Laws or Code of honor, certain arbitrary rules by which social intercourse is regulated among persons of fashion. On one's honor, on the pledge of one's own reputation for integrity. To do the honors, to pay respect and attention to guests in the manner of a host, as at a private or public dinner. Your honor, a common and familiar title of respect paid to untitled gentlemen by many persons in the humbler ranks—still given to some English judges. Affair of honor, a dispute or quarrel, as in connection with the laws of honor, which the disputants consider can only be settled by a duel. Debts of honor, debts contracted in gambling, horse-racing, by verbal promise, and the like, which cannot be enforced in a court of law. **Maids of honor**, ladies who attend upon the queen. **Point of honor**, an obligation whose non-fulfilment would offend the conscience, or a feeling of self-respect.—Syn. of 'honor, n.': boast; renown; reverence; veneration; ornament; decoration; purity; integrity; rank; reputation; magnanimity;—of 'honorable': illustrious; noble; great; magnanimous; generous; honest; estimable; pure; irreproachable; respected; worthy; just; equitable; fair; reputable.

HONOR, Acceptance for: phrase used in the law of bills of exchange, denoting that a stranger volunteers to accept a bill out of respect to a foreign party issuing the bill to persons in this country, who refuse to accept, in which case the stranger accepting, incurs certain responsibilities.

HON'ORABLE — RIGHT HON'ORABLE — MOST HON'ORABLE: titles given in the United Kingdom to Peers, their families, and persons holding certain public situations. A Marquis or Marchioness is styled Most Honorable, a Peer (temporal) or Peeress of a lower grade, whether by right or courtesy, is Right Honorable. The title Right Honorable is bestowed also on the younger sons of Dukes and Marquises, and their wives; and on all the daughters of Dukes, Marquises, and Earls; and Honorable on the younger sons of Earls, and on all the children of Viscounts and Barons. Privy Councilors, the Lords Mayor of London, York, and Dublin, the Lord Advocate of Scotland, and the Lord Provost of Edinburgh, are entitled to the prefix Right Honorable; and Maids of Honor, Lords of Session, the Supreme Judges of England and Ireland, to that of Honorable. Members of the house of commons, though Honorable is not prefixed to their names, are distinguished as the 'Honorable member for ——,' and the East India Company has been held entitled to the same prefix. In the United States, the characteristic love of title has been shown in the practice of attaching Honorable to the names of governors of states, judges, members of congress, and other public functionaries.

HONORARIUM, n. *hŏn'ō-rā'rĭ-ŭm* [L. a present made on being admitted to a post of honor, a douceur: F. *honoraire*]: voluntary fee paid to a professional man, e.g., a counsel or a physician; because such fees were presumed to be given as a present, or more correctly as a mark of honor, and beforehand, and not on the vulgar theory of payment for services rendered. The amount was not left to the payer's will, but was fixed by usage, and varied according to the eminence of the person employed. The legal effect which followed was, that neither counsel nor physician, if not paid their fees beforehand, could bring an action against the client to recover them. This is still the case in the United Kingdom as to counsel, but not as to registered physicians, who can now recover their fees by action. In the United States, the H. is not a recognized usage. See Fees of Lawyers and Physicians. Honorary: see Honor.

HONORIUS, *hō-nō'rĭ-ŭs*, FLAVIUS AUGUSTUS: Emperor of the West: 384–425 (reigned 397–425); second son of Theodosius the Great. On the death of his father, the empire was divided into two parts, H. receiving the western half, with Rome as his capital; but being young, he was put under the guardianship of Stilicho (q.v.), who was all his life the *de facto* ruler of the Western Empire. H. first took up his residence at Milan, where, 398, he married Maria, daughter of Stilicho. The most important events of H.'s reign were the various treaties concluded with the German tribes who dwelt on the Rhine and Upper Danube; the rigorous persecution of paganism 399; and the devastation of n. Italy by Alaric and his Visigoths 400-403. Stilicho was then in Germany; but on his return he speedily cleared the country of the invaders, after totally defeating them at Pollentia (403, Mar.). Another irruption of barbarians, under Rhadagaisus, took place 405-6, which was again repelled by the powerful arm of Stilicho. Nevertheless, this brave soldier and able minister lost the favor of his weak and worthless master, and was treacherously slain at Ravenna 408. Alaric was not slow to take advantage of the opportunity thus afforded him. In 408, he invaded Italy, and besieged Rome, which escaped only on payment of a heavy ransom; and in the following year he again besieged and took it, raising Attalus to the imperial purple. The death of the invader 410, after having a third time besieged Rome, again freed Italy. A new champion of the falling empire arose in the person of Constantius, who having suppressed the rebellions of Constantine, Jovinus, and Sallustius in the northern provinces, and of Heraclian in Africa, was appointed the colleague of H. in the consulship, and received in marriage the hand of Placidia, sister of H., with a share in the empire, which he did not long retain, as his death took place a few months afterward. The Gothic and German tribes had for some time been slowly but steadily encroaching on the Western Empire, and H.'s reign saw Spain, Gaul, and Pannonia, some of the finest provinces, snatched from its grasp. H. was weak and foolish, and when excited by fear or jealousy, he was cruel and treacherous, as was evinced in his treatment of Stilicho and Constantine.

HONO'RIUS I., Pope of Rome: b. in Campania, of a consular family; ruled 625–638, succeeding Boniface V. He has been the subject of much controversy between Rom. Catholics and Protestants, and between the Gallican and Ultramontane schools of the Roman Church. Of his early history, little is known, except that he was active in bringing to a close the disputes in n. Italy about the controversy of the Three Chapters (q.v.). His general administration of church affairs has been favorably judged by historians; and his name is connected especially with the history of the paschal controversy in Ireland, and with that of the early Anglo-Saxon Church. But his pontificate is memorable particularly on account of the Monothelistic heresy: see MONOTHELISM. H. is connected therewith rather negatively, than by any positive participation in the spread of the

Monothelite doctrine. While the controversy was yet new in the West, Sergius, Patriarch of Constantinople, wrote to H., to explain the Monothelistic doctrines in the most favorable light, and to suggest that it would be most desirable to impose silence on both parties, in a dispute which really did not affect the substance of the catholic doctrine. H., misled it is alleged by this statement of Sergius, consented, and even expressed himself in language which appeared to condemn the doctrine of two wills in Christ. The Rom. Cath. historians, however, maintain that in thus disclaiming the belief of two wills in Christ, H. merely denied the existence in Christ of two discordant or conflicting wills, that is, of a *corrupt and sinful human* will opposed to the divine will. It is not easy to reconcile this explanation with the decree of the sixth general council, in which H. is anathematized in company with many others, of whose heterodoxy there can be no doubt. But the defenders of H. reply, that though the sixth council certainly does include H. in one common condemnation with a group of heretical teachers, yet the explanation appended to the condemnation of the former, viz., that 'he had not by the exercise of his apostolic authority extinguished the rising flame of heresy, but by neglecting it, favored its progress,' clearly alludes to the error of judgment described above, by which, though himself personally orthodox, he enjoined silence on the controversy at a time when a more far-sighted ruler would have felt it his duty to interfere by a clear and explicit declaration. On the whole, they maintain that, however H. may by his imprudent silence have compromised the interests of orthodoxy, he did not put forth any such dogmatic declaration as can fairly be regarded, whether by Protestants or by Gallicans, as irreconcilable with the strict ultramontane doctrine of infallibility, inasmuch as that doctrine contemplates the pope as 'speaking from the apostolic chair.' Some letters of his are preserved in Labbe's *Coll. Conciliorum*, III.

HON'ORS OF WAR: privileges allowed to a garrison surrendering, either in consideration of a brave defense, or from some other cause. Many degrees of honor may be paid to a vanquished enemy, according to the generosity or judgment of the victorious commander-in-chief. In some cases, the garrison is allowed to march out with all its arms, drums beating, colors flying, etc.; at another time, the conquered force will be permitted only to advance silently to the front of their works, there to ground or pile arms, and then, facing about, to return to their lines as prisoners of war. Occasionally, the capitulation will provide that the garrison shall deposit their arms and warlike stores at some specified spot, and then march on to their own territory on parole of not serving during the existing war against the victors or their allies.

HONTHEIM, *hŏnt'hīm*, JOHANN NIKOLAUS VON: 1701, Jan. 27—1790, Sep. 2; b. Treves: zealous opponent of Ultramontanism. He was educated in the Jesuit school of his native city, studied canon law at Louvain under the celebrated Van Espen, and afterward taught it for ten years at Treves, of which see he became coadjutor 1748, with the title of bishop *in partibus infidelium.* He is the author of two voluminous works on the history of Treves, *Historia Trevirensis Diplomatica* (3 vols. fol. 1750), and *Prodromus Hist. Trevirensis* (2 vols. fol. 1757). His literary career is memorable for a theological essay, which, though with very mean pretensions to learning, by the novelty and boldness of its views, made an immense sensation in the theological world. The title of this work, which was in Latin, and dedicated to Pope Clement XIII, is 'On the State of the Church and on the Legitimate Authority of the Roman Pontiff,' a work composed with a view to the reunion of Christian sects. The name of the author was long unknown, the work being published under the *nom de plume* of Justinus Febronius (a name said to be taken from that of H.'s niece, who was called Justina Febronia), whence the system of church government which the work propounds has been called Febronianism (q.v.). His scheme may be described as an exaggerated form of Gallicanism, vesting the supreme authority of the church not in the pope but in a general council, with the democratic element of congregationalism superadded. The work immediately after its appearance was condemned by Clement XIII., as well as by many individual bishops. It drew forth a number of replies, the most important of which are those of Zaccaria (1767) and Ballerini (1768). Pius VI., 1778, required from H. a retractation of these doctrines. This retractation, however, was modified by a subsequent *Commentary*, published at Frankfurt 1781, to which, at the desire of the pope, Cardinal Gerdil replied. H. eventually made full submission to the church. He died at Montquinten in Luxemburg.—See Menzel's *Neuere Geschichte der Deutschen*, xi. 456, and following.

HONVÉD [Land-defenders]: name given in Hungary under the earlier kings to the national champions. With the disappearance of these, the word too disappeared; but in the summer of 1848 it was revived, and applied first to those Hungarian volunteers dispatched to the south against the Servians, and subsequently, when the war with Austria really commenced, to the whole patriotic army. Since the reconstitution of Austrian affairs after 1866, the name H. has been given to the Landwehr of the Hungarian portion of the empire.

HOOBLY, *hô'blē* (*Hubli*): town of Dharwar (q.v.), province of Bombay, about 230 m. s.e. of Poona. It is one of the principal cotton-markets in that part of India. A good road has been constructed to the Malabar coast, by which the raw cotton of the neighborhood is easily and cheaply transported for shipment. Pop. (1881) 36,677.

HOOD, n. *hûd* [Low Ger. *hode;* Ger. *huth*, guard, keeping: Dut. *hoed*, a hood—from *hoeden*, to cover]: a covering for the head and shoulders, attached to a cloak or a monk's frock at the back of the collar; a covering drawn upon the head and wrapping round it, leaving the face only exposed;

a covering for a hawk's head; an ornamental fold which hangs down the back of a graduate to mark his degree; in *bot.*, a concave petal resembling a monk's hood: V. to dress or cover with a hood. HOOD'ING, imp. HOODED, pp.: ADJ. having or wearing a hood; covered with a hood. HOOD'LESS, a. having no hood. HOOD'WINK, v. *-wĭngk*, to blind by covering the eyes; to deceive by disguise; to impose on. HOOD'WINKING, imp. HOOD'WINKED, pp. *-wĭngkt.*

HOOD, *hûd* [Icel. *hattr*, manner; *hatta*, to be wont: Bav. *hait*, the condition of a thing: AS. *had*, person, state]: a common postfix, denoting quality, state, condition, character, as man*hood*, priest*hood*.

HOOD, *hûd*, JOHN BELL: 1831, June 1—1879, Aug. 30; b. Owingsville, Bath co., Ky.: soldier. He graduated at the U. S. Milit. Acad. 1853; was assigned to the inf. branch of the army; transferred to the cav. and promoted 1st lieut. 1858; cav. instructor at the Milit. Acad. 1859–60; resigned and entered the Confederate army as 1st. lieut. 1861, rose to the rank of lieut.gen., lost a leg at Chickamauga, and was twice defeated by Gen. George H. Thomas, Franklin, Tenn., 1864, Nov. 30, and Nashville, Dec. 16. After the war he became a commission-merchant and insurance agent in New Orleans, and died in the yellow-fever epidemic.

HOOD, ROBIN: hero of several old English ballads and traditionary stories; which generally represent him as an outlaw and a robber, but of a gallant and generous nature, haunting the depths of Sherwood Forest, Nottinghamshire, and of Barnsdale Forest, Yorkshire, in an early era of English history, which it has hitherto been customary to fix in the 12th c. The earlist authentic notice of him is in the *Vision of Piers Ploughman*, a poem dating 1355–65: 'rhymes of Robin Hood and Randolph Earl of Chester' are there alluded to. About 1495, Wynkyn de Worde printed a poem of considerable length, *The Lytel Geste of Robyn Hood*—apparently a series of rude popular ballads strung together, being probably a modification of the 'rhymes' spoken of in Piers Ploughman. Thus we see evidence for a considerable antiquity to the ballads commemorating Robin H., a collection of which filled two little volumes printed by Ritson 1795. It is also certain that, in the early part of the 16th c., there was a widespread celebration of annual rustic sports and masqueradings, under the name of the *Robin Hood Games*, in which the deeds of the hero, and of his companions, Little John, Friar Tuck, etc., and of his sylvan mistress, Maid Marian, were represented. These even extended to Scotland, where the Reformers had some difficulty in putting them down. In the ballads and the games alike, Robin was always exhibited as a valiant man out of suits with fortune, giving to the poor much of what he took from the rich, most skilful with the long bow and the quarter-staff, and almost unfailingly victorious in personal encounters with whatsoever opponent.

In addition to these evidences of the existence of such a hero, we must remark that his grave has for ages been pointed to in Kirklees Park, Yorkshire, marked by a flat stone on which was carved a flowery cross.

While there could be little doubt that some such predatory outlaw as Robin H. existed, and that he was of a character to excite, generally speaking, the affections rather than the reprobation of the people, there was a lack of documentary evidence regarding him, until the publication of a tract by the Rev. Joseph Hunter 1852. In this *brochure*, it is, first, shown that one of the ballads represents Robin as going, by the invitation of 'Edward our comely king,' to meet him at Nottingham; as there accepting service with his majesty: and as accompanying him to court; where, however, becoming sick almost to death with that kind of life, he did not remain longer than 15 months; after which he retired, and resumed his wonted free and jovial life in the forest. Mr. Hunter then proceeds to show that King Edward II. 1323 made a progress through the western and midland counties, in the course of which he came (Nov. 9) to Nottingham; that in the exchequer accounts between Mar. and Nov. of the ensuing year, among the names of 24 'porteurs' of the king, to whom wages were paid, occur those of 'Robyn and Symon Hod;' and that finally, at the latter date occurs an entry—'Robyn Hod, heretofore one of the porteurs, because he could no longer work, received as a gift, by command, 5*s*.;' the name from this time appearing no more. Mr. Hunter likewise ascertained that, at a date six years antecedent to the royal progress above mentioned, the name of 'Robertus Hood' is found in the court-rolls of the manor of Wakefield, as that of defender in a suit regarding a small piece of land. The probability therefore is, that Robin H. lived and acted as the ballads represent him only a few years before the era of Piers Ploughman, and really passed from wild forest life into the royal service for a brief space—an adventure which might appear as the most incredible attributed to him, if we did not know something of the whimsical and puerile character of Edward II., which was such that he did not disdain occasionally to seek amusement in playing at chuck-farthing with his servants. Mr. Hunter further deemed it likely that H. was one of the yeomen who joined the discontented barons under the Earl of Lancaster, and were ruined by the failure of their enterprise. If so, his life in the forest might be rather a sort of guerrilla warfare than a practice of simple rapine; and hence it might, in some measure, arise that the 'gests' of Robin H. became the subject of so much romantic and affectionate sentiment on the part of the community.

HOOD, Viscount (Samuel Hood): English admiral: 1724–1816, June 27; b. Butleigh, Somersetshire, where his father was a vicar. At 16, he entered the royal navy, was made lieut. 1746, and post-capt. 1756. In 1759, being in command of the *Vestal*, 32 guns, he engaged a French 50-gun ship, which he took after a desperate action of four hours. In 1777, he was made commissioner of Portsmouth dockyard, and next year received a baronetcy. He was then made rear-admiral, was sent to the W. Indies to reinforce Rodney, and commanded a division in the engagement with the Count de Grasse, 1782, Apr. 12. He was made a peer of Ireland with the title Baron Hood. In 1793, he was made commander-in-chief of the Mediterranean fleet, and took possession of the port of Toulon; but the French republican army, in great force, compelled him to evacuate it, after destroying or carrying away the principal part of the shipping, firing the arsenal and public stores. He then sailed for Corsica, which, after a campaign, he annexed to the crown of Great Britain. In 1796, he was advanced to the rank of a viscount of Great Britain, and made gov. of Greenwich Hospital. He died at Bath.—His younger brother, ALEXANDER H., served as rear-admiral under Lord Howe, was second in command at Lord Howe's victory, 1794, June 1, obtained a victory over the French fleet 1795, and was made, 1796, Baron, and 1801, Viscount Bridport. He died 1814.

HOOD, THOMAS: 1789, May 23—1845, May 3; b. London; son of a bookseller. After leaving school he was placed in the counting-house of a Russian merchant, but his health failing, he was sent to Dundee. At the age of 17, he returned to London, and engaged himself to learn the art of engraving with his uncle. In 1821, he was offered the post of sub-editor of the *London Magazine*, which he accepted, and at once entered on its duties and an extensive literary acquaintance. His first separate publication was entitled *Odes and Addresses to Great People*. He published *Whims and Oddities* 1826, of which a second and third series appeared during the two following years. In 1829, he commenced *The Comic Annual*, and continued it nine years. He edited *The Gem* for one year, contributing to its pages his striking poem entitled *Eugene Aram's Dream*. In 1831, he went to reside at Wanstead in Essex, where he wrote his novel of *Tylney Hall;* but pecuniary difficulties, supervened, and he returned to London 1835. In 1838, he commenced the publication of *Hood's Own*, to which his portrait was attached. Health failing about this time, he went to reside on the continent, and remained six years. In 1839, he published *Up the Rhine*, the idea of which was taken from *Humphry Clinker*. On his return to England, he became editor of *The New Monthly Magazine*, and on his withdrawal from its management 1843, he published *Whimsicalities*, consisting chiefly of his contributions to that serial. In 1845, he started *Hood's Magazine*, and contributed to it till within a month of his death. During his last illness, Sir Robert Peel conferred on him a pension of £100 a year, which was transferred to his wife. He was buried in Kensall Green Cemetery. Compare *Memorials of Thomas Hood, Collected, Arranged, and Edited by his Daughter, with a Preface and Notes by his Son* (2 vols. 1860).

H. takes a high place both as a humorist and as a serious poet. He is great at once in comedy and pathos, and he sometimes curiously mingles and combines both. As a punster, he was supreme: he connects far-separated words and ideas by the most subtle analogies, and sends them loose. This 'fatal facility' of dealing with words as the implements for a mechanical jest, and in senses aside from their real meaning, was his supreme defect. Much of his comedy is verbal and shallow, and will be soon forgotten. It is as a poet that H. will be remembered. His *Eugene Aram's Dream*, *Song of the Shirt*, and *Bridge of Sighs*, are among the most perfect poems of their kind in the English language.—His son Tom H. (1835–74) was a writer of somewhat similar though less striking gifts.

HOOD'ED SEAL, or Crested Seal: see Seal.

HOOD-MOLD'ING: see Dripstone.

HOODOOISM: see Voodooism.

HOOF, n. *hôf* [Dut. *hoef;* Icel. *hófr;* Norw. and Dan. *hov*]: the horny substance that covers the toes of many animals. Hoofed, a. *hôft*, having hoofs. Hoof'less, a. without hoofs. Hoofs, or Hooves, n. plu. *hôfs, hôvz* (see Horny Tissues).

HOOFS: horny covering of the feet of many quadrupeds. In some species, as the horse, they are entire; in others, as cattle and sheep, they are cloven. Serious injury to the H. causes lameness and severe pain, and may disable the animal for work. If driven far over hard roads, cattle and sheep are liable to become foot-sore. When the horn, which has been worn thin, regains its usual thickness, the trouble ceases. Cattle worked on roads, or on stony land, often need to have their H. protected by shoes. Horses, from their extensive use for driving and drawing loads, are liable to injuries of the H. Shoeing is almost universal, though a few people assert that in the great majority of cases it is unnecessary. The H. are often injured by bad shoeing, and by allowing the shoes to remain on until the feet have outgrown them. The shoes should be re-set every four or six weeks. Injuries to the H. require prompt attention. If a wound is produced, as by stepping on a nail, or by the calk of a sharp shoe, it should be cleansed and poulticed. When the inflammation subsides apply a healing balsam. Cracks in the H. may be caused by overwork or by improper shoeing. They should be treated by a veterinarian. Brittle and contracted H., caused by standing on a dry floor, should be softened with poultices and then dressed twice a day with ointment made of equal portions of powdered charcoal, turpentine, and linseed oil. Turning the animal into a pasture for a few weeks is highly beneficial. In all serious injuries to the H. rest and careful feeding are essential.

HOOFT, *hōft*, Pieter Cornellisen: 1581, Mar. 16—1647, May 21; b. Amsterdam: Dutch historian and poet. He studied at Leyden; and travelled in France, Germany, and Italy. He died at the Hague. His chief historical works are *Het Leven van Koning Hendrik IV.* (Amst. 1626–52), and *Nederlandsche Historien* (2 vols. Amst. 1642–54; most recent edition, 1820–23). The latter of these is still of great value, and is one of the classics of Dutch literature. H. also translated Tacitus into Dutch. As a poet, his *Minnedigte* have not been surpassed, if even equalled, as specimens of the light Anacreontic muse. His *Letters* were published by Huydecooper, 1738. H. exercised an important influence on the development of the Dutch language.

HOOGHLY, or HÚGLÍ, *hôg'lĭ:* a river of Bengal Proper; formed, in lat. 23° 25′ n., and long. 88° 22′ e., by the junction of the first two offsets of the Ganges, the Bhagrutti and the Jellinghi. From the point in question, the stream, strictly so called, is 125 m. long; the estuary, as far as Saugor Roads, measuring 35 m. more. Of all the channels by which the Ganges reaches the sea, the H. is the most available for navigation. In the dry season, the tide is felt nearly up to Chandernagore, 17 m. above Calcutta. During the s.w. monsoon, the H. is subject to the phenomenon known as 'The Bore' (q.v.). Up to Calcutta, the draught is seldom less than 17 ft.; but the bottom is said to be silting up. At its entrance, too, the H. is much encumbered with shoals.

HOOGHLY, or HÚGLÍ, *hôg'lĭ:* district of Bengal, British India: lat. 22° 13′ 45″–23° 13′ 15″ n., long. 87° 47′–88° 33′ e.; including Howrah, 1,467 sq. m. It is bounded n. by the district of Bardwan, e. by the H. river, s. by the Rupuarayan river, w. by the same river and dist. of Bardwan; drained chiefly by the H., Damodar, and Rupuarayan rivers; and has a generally flat surface, with a gradual ascent to the n. and n.w.: and with considerable marshes between the large rivers. About 13-16th of the cultivated area is in rice—the staple crop—the remainder in barley, wheat, Indian corn, peas, pulses, oil-seeds, vegetables, jute, hemp, cotton, sugar-cane, mulberry, and tobacco. The principal manufactures are silk and cotton; imports, common rice, English piece-goods, lime, and timber; exports, fine rice, silk, indigo, jute, cotton-cloth, and vegetables. There are 7 towns with pop. more than 5,000 each; 625 govt. schools, with 22,666 pupils (1877–8), and H. college, the chief educational institution. There are 10 stations on the E. Indian railway; 6 canals; 7 hospitals and dispensaries, and numerous shrines and sacred places. Pop. dist. (1872) 1,488,556; administrative town, same name, 34,761.

HOOGHLY, or HÚGLÍ: city of Bengal Proper, on the right or w. bank of the river H., 27 m. n. of Calcutta. Pop. (1881) of H. with Chinsura (q.v.) immediately to the south, 31,177, of whom only 7,000 are Mohammedans. Here is a college for English and Asiatic literature, which owes its existence mainly to the munificence of a native; it has several allied schools. H. is the administrative headquarters of the dist. of the same name.

HOOK, n. *hûk* [Dut. *hoeck;* Low Ger. *hake;* Icel. *haki;* Pol *hak*, a hook]: a piece of metal or other substance bent or curved so as to catch, hold, or sustain; a curved cutting instrument; a sickle; a snare; a trap: V. to catch, draw, or fasten, as with a hook; to draw by force or artifice; to bend. HOOK'ING, imp. HOOKED, pp. *hûkt:* ADJ. bent like a hook; curved. **HOOK'EDNESS**, n. *-ĕd-nĕs*, state of being curved like a hook. **HOOK'Y**, a. *-ĭ*, pertaining to or full of hooks. **HOOK-NOSED**, having a nose curved somewhat like a hook; aquiline. **HOOK AND EYE**, simple fastening for ladies' dresses (see HOOKS AND EYES). **OFF THE HOOKS**, disturbed; out of place; done for; dead. **BY HOOK OR BY CROOK**, by any means; one way or another; by foul means or by fair means, as if foully by the *hook* of the thief, or righteously by the *crook* of the bishop. **ON ONE'S OWN HOOK**, on one's own account; for one's self and not with others. *Note.*—This last expression arose from the practices of the N. American fishermen, in entering upon engagements with owners of fishing craft: (1) a crew would bargain for half the net value of the fishing, and receive share-and-share alike; or (2) each one of the crew would bargain to receive half of the net value of his own individual exertions, and then a fisherman was said 'to fish on his own hook.'

HOOK, *hŭk*, THEODORE EDWARD: 1788, Sep. 22–1841, Aug. 24; b. London: novelist and dramatic writer. He was educated at Harrow. In 1805, at the age of 17, he produced an operatic farce, the *Soldier's Return*, which was very successful; and 1805–11, he wrote 12 other popular operatic pieces and farces. His ready wit, sparkling humor, and wonderful powers of improvisation made him the delight of society; and having pleased the prince regent by his feats of mimicry, he was appointed (1813) accountant-gen. and treasurer of the Mauritius, with salary and allowances amounting to nearly £2,000 a year. These offices he held till 1818, when the discovery of a considerable deficiency in the military chest caused him to be arrested and sent to England, and his effects seized and sold. The peculation, it afterwards appeared, had been committed by his deputy, who killed himself. On obtaining his liberty, H. supported himself by writing for newspapers and magazines, and on the establishment of the *John Bull*, weekly tory newspaper, 1820, he was appointed its editor. From his connection with this bold, clever, and, at that time, virulent print, he derived, during its prosperous state, fully £2,000 a year. In 1823, Aug., for his debt to the government, amounting to about £12,000, he was arrested, under an Exchequer writ, and his property sold. He remained within the rules of the king's bench till 1825, May, when he was released from custody. In 1824 appeared, 3 vols. 8vo, the first series of his *Sayings and Doings*, which yielded him £2,000. For a second series, 1825, and a third, 1828, he received (for each) 1,000 guineas. Several other three-volumed novels were published by him in rapid succession, such as *Maxwell*, 1830; *Love and Pride*, 1833; *Gilbert Gurney*, a sort of autobiography of himself, 1835; *Jack Brag*, 1837; *Births, Deaths, and Marriages*, 1839; *Gurney Married*, 1839, etc.

HOOK, WALTER FARQUHAR, D.D.: 1798, Mar. 13—1875, Oct. 20; b. Worcester, England; son of the Rev. James H., Dean of Worcester, and nephew of Theodore Edward H. He was graduated at Christ-Church, Oxford, 1821. After holding minor preferments in the church, he was appointed vicar of Leeds, 1837, and dean of Chichester, 1859. In 1856, the Bp. of Ripon, taking leave of the clergy of his diocese, stated that 20 churches had been built in Leeds through the exertions of Dr. H., while schoolrooms had been provided for more than 10,000 children. Among his works are *An Ecclesiastical Biography, containing the Lives of Ancient Fathers and Modern Divines* (8 vols. Lond. 1845–52), *A Church Dictionary* (8th ed. 1859), *Sermons Suggested by the Miracles of our Lord and Saviour Jesus Christ* (2 vols. 1847), *On the Means of Rendering More Effectual the Education of the People* (10th ed. 1851), and *Lives of the Archbishops of Canterbury*, on which he was working to the last, vol. XI., containing the lives of Laud and Juxon, appearing immediately after his death. He was elected a fellow of the Royal Soc. 1862.

HOOKAH, or HOOKA, n. *hô'kâh* [Hind. *hukkah;* Ar. *hugga*]: a pipe with a long flexible tube in which the smoke, before being inhaled, is made to pass through a water vase; a narghilé: see PIPE.

HOOKE, *hûk*, ROBERT: English natural philosopher: 1635, July 18–1703, Mar. 3; b. Freshwater, Isle of Wight. He was educated at Westminster School, and at Christ-Church, Oxford. In 1664 he was appointed prof. of geometry in Gresham College, London; and 1666, surveyor for the city of London, a most lucrative appointment. He died at Gresham College. H. had extraordinary inventive genius, and has justly been considered the greatest of philosophical mechanics; his wonderful sagacity, almost intuition, in deducing correct general laws from meagre premises, has probably never been equalled. There was no important invention by any philosopher of that time which was not in part anticipated by Hooke. His theory of gravitation subsequently formed part of Newton's; he anticipated the invention of the steam-engine, and the discovery of the laws of the constrained motions of planets. Among his own completed discoveries are, the law of the extension and compression of elastic bodies, '*ut tensio sic vis;*' the simplest theory of the arch; the balance-spring of watches and the anchor-escapement clocks; the permanency of the temperature of boiling-water. For the quadrant, telescope, and microscope also, we are materially indebted to him.

HOOKER, n. *hûk'ėr:* a small Dutch vessel.

HOOKER, *hûk'ėr*, JOSEPH: 1814, Nov. 13—1879, Oct. 31; b. Hadley, Mass.: soldier. He graduated at the U. S. Milit. Acad. 1837; was assigned to the artill. branch of the army; served in the Seminole Indian war and through the Me. boundary trouble; was adjt. of his regt. 1842–46; was brevetted capt., maj. and lieut.col., and promoted capt. for gallantry in the Mexican war 1846–48; resigned from the army 1853; and became a farmer in Cal., supt. of milit. roads in Or., govt. surveyor, and col. of Cal. militia. He volunteered his services to the govt. at the outbreak of the civil war; was appointed brig.gen. of vols. 1861, May 17;

served in the defenses of Washington and on the lower Potomac till 1862, Apr., when he was appointed to command the 2d div. 3d corps, Army of the Potomac, with which he fought at Yorktown, Williamsburg—where his div. held the entire Confederate army in check nearly all day—Fair Oaks, Frazier's Farm, Glendale, and Malvern; promoted maj.gen. of vols. for Williamsburg; commanded his div. at Manassas, Chantilly, South Mountain, and Antietam; promoted brig.gen. U.S.A. 1862, Sep. 20, assigned to command the centre grand div. (3d and 5th corps) of the army after Burnside succeeded McClellan; and held this command at Fredericksburg 1862, Dec. 12; and appointed commander of the army of the Potomac 1863, Jan. 25. He fought the battle of Chancellorsville in May, hurried his army to cut off the Confederate invasion of Penn., and failing to obtain some support demanded, asked to be and was relieved of the command in June. In 1863, Sep., he became commander of the Army of the Cumberland, relieved Chattanooga, captured Lookout Mountain after a memorable battle above the clouds Nov. 24, was in the successful attack on Missionary Ridge, the pursuit of the Confederate army, and the action at Ringgold Nov. 26. He accompanied Sherman to Atlanta, was relieved of command at his own request 1864, July 30, brevetted maj.gen. U.S.A. 1865, Mar. 13, mustered out of the vol. service 1866, Sep. 1, and placed on the retired list as maj.gen. U.S.A. 1868, Oct. 15. He received the thanks of congress for his skill and energy in covering Washington and Baltimore when threatened by the Confederates, and as 'Fighting Joe' was beloved by all the men under him. See CHATTANOOGA, BATTLES OF.

HOOKER, Sir JOSEPH DALTON, M.D., C.B., F.R.S., D.C.L.: botanist: b. Glasgow, 1816; son of Sir William J. Hooker (q.v.). He was educated for the medical profession, and graduated M.D. Glasgow 1839. He immediately turned his attention to botany, and joined the antarctic expedition of the *Erebus* and *Terror*. When he returned 1843, he brought with him 5,340 species of plants, which with the discoveries of Captain Cook and other voyages, were published in six quarto vols., under the title *Botany of the Antarctic Voyage* (1847–60). This work gave him an eminent position in science. In 1847, he undertook an expedition to the Himalayas, which occupied three years. The large collections made at this time were joined to those of his friend, Dr. Thomas Thompson of the Botanic Gardens, Calcutta, and numbered in the aggregate nearly 7,000 species. His *Himalayan Journals* (2 vols. 8vo, 1854) contain the narrative of this expedition, and the *Rhododendrons of the Sikkim-Himalaya* (1849–51) illustrate the most remarkable additions which he made to the list of garden-plants. With Dr. Thompson he undertook a *Flora Indica* (I. 8vo, 1855), but this vol. first remains a fragment, half of it being occupied with a valuable dissertation on botanical geography. He afterward again undertook a flora of British India, completed 1874. In 1871, he made an expedition to Morocco, ascended the Great Atlas, the summit of which had never before been reached by a European, and brought back a valuable collection of plants.—Dr. H. was appointed asst. director at Kew Gardens 1855, and on the death of his father 1865, he succeeded him as director. He was pres. of the British Assoc. 1868, was appointed companion of the Bath 1869, and elected pres. of the Royal Soc. 1873. He became knight commander of the Star of India 1877, and LL.D. of Dublin 1878. In the list of scientific memoirs published by the Royal Soc., he is recorded as the author of 58 independent memoirs, and joint author of 18 more. He has prepared a valuable *Students' Flora of the British Islands.* His great work, undertaken in conjunction with George Bentham, is the *Genera Plantarum* (3 vols. 1862–83).

HOOK'ER, MOUNT: see ROCKY MOUNTAINS.

HOOKER, RICHARD: author of the Books of Ecclesiastical Polity, and one of the most illustrious English theologians: abt. 1554–1600; b. Heavitree, near Exeter. He was early distinguished for 'quick apprehension of many perplext parts of learning,' and attracted the notice of Jewell, Bp. of Salisbury; through whose influence he was sent to Oxford about his 15th year. He was placed at Corpus Christi College, was advanced first to the dignity of scholar, then of fellow of his college. After about 3 years' residence as fellow, he entered into sacred orders, and ere long (abt. 1581) was appointed to preach at St. Paul's Cross. Hither all the power and eloquence of the church found their way in the 16th c. To H., however, the trial of such a public appearance was evidently considerable, according to Walton's account; and the more as the weather was unfavorable for his journey; but the diligent attendance of a Mrs. Churchman enabled him to perform the office of the day. Mrs. Churchman's kindness proved too much for the simple-minded theologian, who was led, evidently without due consideration, into a marriage with her daughter. This marriage was far from proving a source of happiness. Walton's description of the visit of his two old pupils, Edwin Sandys and George Cranmer, and 'Richard called to rock the cradle' from their company, is among the characteristic sketches of that fine old writer. The visit was made to Drayton-Beauchamp, Buckinghamshire, where H. had settled 1584, as a country priest. He was transferred ere long to the mastership of the Temple, by the patronage of Abp. Whitgift; and here he was plunged into the controversy with Puritanism, out of which his great work arose. Travers, one of the most zealous of the Elizabethan Puritans, was his colleague in the Temple. Travers was the more attractive and popular orator, though the less profound thinker. The colleagueship was not a happy one. The congregation 'ebbed in the forenoon,' Fuller tells us, 'and flowed in the afternoon.' 'Pure Canterbury' was in the ascendant in the morning, 'Geneva' in the afternoon. H. soon tired of the contention in the congregation, and the indifference of the majority to his ministry. He accordingly applied to the abp., who presented him, 1591, to the rectory of Boscum, in the diocese of Salisbury, and six m.

from that city. Here he remained four years, busily employed with his great work, which his experience in the Temple probably prompted. The first four books of the Ecclesiastical Polity appeared 1584. In the same year, he was transferred to the living of Bishopshorne, near Canterbury, where he spent the few remaining years of his life, and gave to the world the fifth book of the Polity. The remaining three books were posthumous. About 1600, in the 46th year of his age, he caught cold in his passage from London to Gravesend, and gradually sank under the weakness which followed.

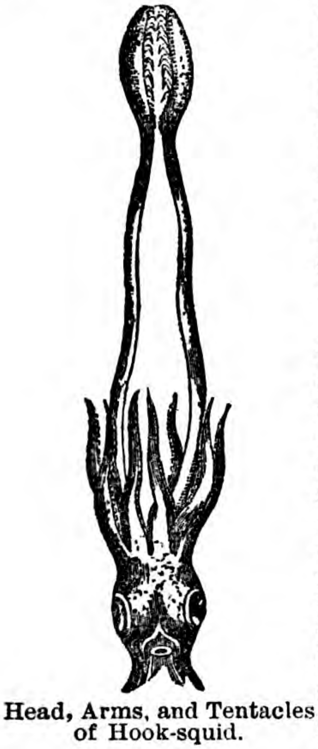
H. will always be esteemed one of the most illustrious thinkers and writers, not only in English theology, but in English literature. He is alike comprehensive and profound, tranquil and eloquent. He is speculative without mysticism, and earnest without declamation. He searches all the depths and rises to all the heights of his subject, without ever forgetting the simplicity of the Christian or breaking the charm of catholic association that binds all its parts together. More than anything he is wise and *judicious* in the highest sense of that word; and it is the light of lofty calm and wisdom, shining through his pages, that continues to make them a delightful and excellent study, while most of the contemporary theological works are forgotten.

HOOK'ER, THOMAS: 1586–1647, July 7; b. Markfield, Leicestershire, England: clergyman. He studied theol. at Cambridge Univ., was appointed lecturer and asst. minister at Chelmsford 1626, silenced for non conformity 1630, forced by persecution to leave England, preached in Delft and Amsterdam 1630–33, came to America with John Cotton (q.v.) and Samuel Stone, arrived in Boston 1633, Sep. 3, and settled in the present Cambridge, was chosen pastor of the 8th church organized in Mass. colony 1633, Oct. 11, and with his entire congregation removed to Conn. 1636, June, and founded Hartford, becoming the first minister there. His publications include *A Survey of the Sum of Church Discipline* (1648), *The Application of Redemption by the Effectual Work of the Word and Spirit of Christ for the Bringing Home of Lost Sinners to God* (1657), and *The Poor Doubting Sinner Drawn to Christ* (7th ed. 1743).

HOOK'ER, Sir WILLIAM JACKSON, F.R.S.: 1785, July 6—1865, Aug. 12; b. Norwich: English botanist. His first work was *Journal of a Tour in Iceland* in 1811, which attained popularity, From that time to his death he was almost incessantly engaged in the publication of botanical works. His investigations on the British Jungermanniæ and Mosses led to his appointment to the chair of botany in the Univ. of Glasgow, where he lectured with great success till 1841, when he resigned his professorship on being chosen director of the Royal Gardens at Kew. His name was enrolled in the list of all the scientific societies at home and abroad; and he was knighted 1836, for high scientific acquirements. The following are some of his most important works: 1. *Monograph of the British Jung-*

ermanniæ (1812–16); 2. *Muscologia Britannica*, the mosses of Great Britain and Ireland (1818); 3. *Icones Filicum* (in association with Dr. Greville), (2 vols. fol. 1826–37): 4. *The British Flora* (1830), seven editions; 5. *A Century of Orchidaceous Plants* (4to. 1848); 6. *The Victoria Regia;* 7. *Icones Plantarum* (10 vols. 1837–60); 8. *British Ferns* (1862); 9. *Garden Ferns* (1862).

HOOKS AND EYES: fastenings for dresses. Formerly made by hand; now by machines of great simplicity and beauty, with a pair of which it is possible to make 200 hooks and eyes in one minute. The operations of the machine are, first, to draw the wire forward from the supplying reel, then cut off the length required for hook or eye, as the case may be; a sinker then descends and forces it into a slot, by which it is bent, and two projecting cams, acting at the same time on the two ends, bend them over to form the lateral loops used for sewing the hook or eye to the garment; then, in the case of the hook, it is passed under another sinker, which forces the doubled wire into another slot, and forms the hook part. One side of the slot, being movable, is made to strike the bent portion of the hook sufficiently to flatten it. It is then complete, and drops out, to make room for another.



Head, Arms, and Tentacles of Hook-squid.

HOOK-SQUID: common name for cephalopod mollusks of the genera *Onychoteuthis* and *Enoploteuthis*, allied to the common squids or Calamaries (q.v.), but having the eyes destitute of any covering of skin. The arms have two rows of suckers; the tentacles much exceed them in length, and are furnished with hooks at their extremities. Hook-squids are found in the Sargasso Sea, in the Polynesian Seas, etc They are dreaded by swimmers and divers, being often of large size—sometimes six ft. long or more—while their hooks, their many arms, their very numerous suckers, and their strong, sharp mandibles, give them a place among the most formidable monsters of the deep.

HOONDEE, or **HOUNDI**, or **HUNDI**, n. *hôn'dē* [Hind. *hoondee, hundi*]: in *India*, bill of exchange; a check given by a native banker on another native banker.

HOOP, n. *hôp* or *hûp* [Dut. *hoep*, a ring: Swiss, *hup*, convex: F. *houpe*, a tuft]: a band of wood or metal used to bind together the staves of casks, etc.; anything circular: V. to fasten or bind with hoops; to encircle or surround. **HOOP'ING**, imp.: N. stuff for hoops. **HOOPED**, pp. *hôpt* or

UNIVERSITY OF
ILLINOIS LIBRARY

hûpt. **Hoop'er**, n. one who. **Hoops**, stiff circular bands formerly used to extend ladies' dresses; crinoline (q.v.). **Hoop-iron**, narrow thin strips of iron for making hoops.

HOOP ASH: see **Nettle-tree.**

HOOPER, *hûp'ėr*, John: English prelate and martyr: abt. 1495-1555, Feb. 9; b. in Somersetshire. He was educated at Oxford. By the study of the works of the German Reformers, and of the Scriptures, he was converted to Protestantism, and 1539 escaped to France from threatened persecution. He soon returned to England, but was again compelled to flee in the disguise of a sailor. He went to Germany, was married there, and settled in Zurich. After the accession of Edward VI., he returned to England 1549 and became a preacher to great crowds in London. In 1550, he was appointed Bp. of Gloucester, but his objections to wearing the Espiscopal vestments caused delay in his consecration. In 1552, he received the bishopric of Worcester *in commendam:* and discharged all the duties of that office with rare zeal, diligence, and self-sacrifice, preaching three or four times a day in the towns and villages, and supplying a free dinner daily to the poor of the city whom he called to share with him in his own hall. On the commencement of Mary's reign, 1553, he was committed to the Fleet, where he remained for 18 months, being frequently examined before the council; but continuing firm in the Protestant faith, he was condemned as a heretic, and burned at the stake at Gloucester. He was author of numerous sermons and controversial treatises. His views were substantially the same as those afterward advocated by the Puritans.

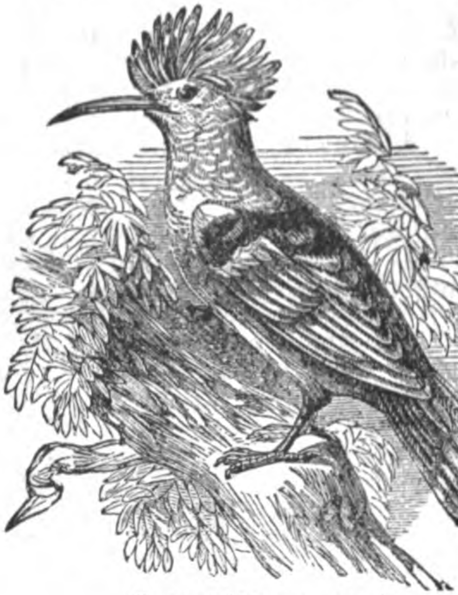
HOOPER, William: 1742, June 17—1790, Oct.; b. Boston; signer of the Declaration of Independence. He graduated at Harvard College 1760, studied law with James Otis, removed to Wilmington, N. C., to practice 1767, aided the govt. in subduing the 'regulator' insurgents 1770, was elected to the gen. assembly of N. C. 1773, and to congress 1774,5,6, served on important committees in both bodies, fled from his home on the occupation of the dist. by the British, and filled several public offices till his retirement to private life 1787.

HOOPING-COUGH, or Whooping-cough, n. *hôp'ĭng-kŏf* [F. *houper;* Swiss, *hopen*, to call out: Bret. *hopa,* to call to a distance (see Whoop)]: Pertussis: infectious, and sometimes epidemic disease, mostly attacking children, especially in the spring and autumn. Its earliest symptoms, which usually appear five or six days after exposure to infection, are those of a common cold, as hoarseness, a watery discharge from the eyes and nose, oppression of the chest, a short dry cough, and more or less feverishness. This stage, the *catarrhal*, lasts a week or ten days, when the fever remits, and the cough begins to be followed by the peculiar whoop which characterizes the disease, and which is caused by the inspiration of air through the contracted cleft of the glottis: see **Larynx.** The disorder may now be regarded as fully developed, and consists of paroxysms of severe coughing, which usually terminate in the expectoration of glairy mucus, or vomiting. During the fit of coughing, the face becomes red or livid, the eyes project, and the child seizes some person or object near him for support. These paroxysms occur at certain intervals, but usually about every two hours, and between them the child returns to his play, takes his food with good appetite, and exhibits little or no signs of illness. The disease reaches its height at about the end of the fourth week, after which the paroxysms diminish in frequency, and the patient shows signs of improvement. The second stage may last from two to eight weeks, and is succeeded by what may be termed the convalescent stage, the duration of which is very variable.

This is one of those diseases which seldom occur more than once in a lifetime, though cases are on record of two or even three attacks of the same patient, the last attack being in old age. Few children escape it, but it is comparatively rare in adults. Morbid anatomy has failed to throw any direct light on its special seat. The proportion of deaths to recoveries in cases of hooping-cough has not been satisfactorily determined, but when there is a severe epidemic, the mortality due to this disease is often great; the deaths, however, in the great majority of cases, occur among the poorer classes. This mortality is, in reality, due not to the disease itself, but rather to the bronchitis and pneumonia (or inflammation of the lungs), or to the convulsions which are frequent complications of hooping-cough.

The treatment of hooping-cough, as long as it is uncomplicated or simple, should not be meddlesome. Nothing that can be prescribed in the early stages will check its natural course, and the object of the physician should be to ward off complications, and to conduct the disease to its natural termination. The diet should consist of milk and unstimulating farinaceous matters. The bowels should be kept moderately open. If the weather is cold, the child should be kept in the house with the temperature of the room at about 60°. A grain, or a grain and a half of ipecacuanha may be given three or four times a day. Slight counter-irritants may also be applied to the surface of the chest: Roche's Embrocation, which consists of olive oil, with half its quantity of the oils of cloves and amber, is extensively used for this purpose. Nothing is so serviceable in the last or convalescent stage as change of air, often even when from a pure to a comparatively impure atmosphere; and next to this, the internal use of a solution of binoxide of hydrogen (see HYDROGEN, BINOXIDE OF) seems most worthy of trial. These remedies should be administered under medical advice.

HOOPOE, n. *hôp'ō* [F. *huppe;* OF. *hupe*, a hoopoe; F. *houppe*, a tuft—from L. *upŭpa*, so called from its sound], (*Upupa*): genus of birds of the order *Insessores*, tribe *Tenuirostres*, family *Upupidæ*. To this family are referred also the genera *Promerops*, *Epimachus* (Plume-birds), etc., natives of warm parts of Asia and its islands, Australia, and Africa, some of which are of magnificent plumage. In the whole family, the bill is long and slender, the wings are of moderate size or short, the legs short, the toes long, and the claws strong and curved. There are among them, however, great diversities, which have led some to divide them into two families, *Upupidæ* and *Promeropidæ*. The genus Promerops and its nearer allies have a close relation to the *Meliphagidæ*, which they resemble in partly feeding on the sweet juices of plants, in order to which the tongue is extensile and divided at the tip. The hoopoes, on the other hand, exhibit many points of resemblance to the crow family, with which they are connected by the choughs, and some points of resemblance even to hornbills. The tongue is short, and not extensile. The



Hoopoe (*Upupa epops*).

COMMON H. (*U. epops*) is a bird of n.east Africa, a summer visitant of most parts of Europe; found also in China. Siberia, and some other parts of Asia; not frequent in Britain, though sometimes seen in autumn, very seldom breeding in any part of the island. It is about the size of a missel-thrush; its plumage exhibits a fine mixture of white, buff, and black; and it has a large crest of two parallel rows of feathers. The H. derives its name from its very frequent utterance of a low soft sound resembling the syllable *hoop*. This bird, beautiful to the eye, is offensive by the foulness of its nest, and by the filth in which it seeks its food.—Eight or nine so-called species have been described by some writers, but the best authorities recognize only five.

HOORN, *hōrn*: decaying town and seaport of the Netherlands, province of N. Holland; agreeably situated on a bay of the Zuider Zee, 20 m. n.n e. of Amsterdam. It was formerly one of the most flourishing towns of its province; but, like all the towns of N. Holland on the Zuider Zee, it has greatly fallen off in trade and prosperity. There are at H. extensive markets for butter and cheese, and fishing and commerce are carried on to some extent. Here the large nets for herring-fishing were invented. Pop. 10,000.

HOO'SAC TUN'NEL: see TUNNEL.

HOOSICK FALLS, *hô'sĭk:* village in H. tp., Rensselaer co., N. Y.; on the H. river and the Boston Hoosac Tunnel and Western railroad; 21 m. n.w. of North Adams, Mass., 26 m. n.e. of Troy. It contains a graded school, 5 churches, 1 national bank (capital $60,000), 2 iron foundries, steam saw-mill, large mowing-machine works, several minor manufactories, and a newspaper. Pop. (1880) 4,530.

HOOSIER, n. *hô'zhėr* [playfully applied to the first settlers of Indiana—either from *husher*, because they were considered as men of great physical strength, or from their rough exclamation when one knocks at a door, '*Who's yere?*']: *colloq.*, native or citizen of Indiana.

HOOT, n. *hôt* [Fin. *hutaa*, to shout, to call: Norw. *hut*, a cry to silence a dog: W. *hwt*, off with it! away!]: a kind of shout given in contempt: V. to cry or shout in contempt; to drive with noise and shouts; to cry as an owl. HOOT'ING, imp.: N. shouting and crying in contempt. HOOT'ED, pp.

HOP, v. *hŏp* [Ger. *hüpfen;* Icel. *hoppa;* Dut. *hoppen;* AS. *hoppian*, to hop, to frisk]: to proceed by short leaps on one leg; to skip lightly; to walk lamely; to limp: N. a short leap or spring on one leg; a light leap. **Hop'ping**, imp.: N. the act of advancing by short leaps. **Hopped**, pp. *hŏpt.* **Hop'per**, n. *-pėr*, one who. **Hop-scotch**, a children's game, in which one hops about among a number of stones laid in regular form upon the ground, without touching any one of them: see Scotch.—Syn. of 'hop, v.': to dance; jump; skip; leap; halt; move; play; spring.

HOP, n. *hŏp* [Ger. *hopfen;* Dut. *hop* or *hoppen;* F. *houblon*, hops: mid. L. *hupa*, the hop-plant]: climbing plant whose seeds or flowers give bitterness to beer and ale. **Hops**, plu., strobili or ripened cones of the female hop plants (see Hops, below). **Hop**, a. pertaining to hops: V. to impregnate with hops. **Hop'ping**, imp. **Hopped**, pp. *hŏpt:* Adj. impregnated with hops. **Hopbine**, n. *-bīn*, the stalk or stem of the hop.—The *Hop* (*Humulus lupulus*), is a perennial diœcious plant of nat. ord. *Cannabinaceæ* (q.v.), the only species of its genus; formerly reckoned in the ord. *Urticaceæ*. It has long rough twining stems, and stalked 3–5-lobed rough leaves, and is a plant of luxuriant growth and abundant foliage. The male flowers grow in loose branching axillary panicles, and consist of five stamens surrounded by a 5-lobed perianth. The female flowers are in *strobiles*, or cones, with large persistent, concave, entire scales, which enlarge as the fruit ripens. The part of the hop so much used in brewing, and sold under the name of *hops*, is the ripened cone of the female plant. Female plants alone, therefore, are cul-

Hop (*Humulus lupulus*).

tivated to any considerable extent; a few male plants, scattered over a field, suffice

The oil of hops is sedative, anodyne, and narcotic; hence the value of pillows stuffed with hops in cases of mania, sleeplessness, etc. The bitter principle is not narcotic, but it is tonic. The oil and bitter principle combine to make hops more useful than chamomile, gentian, or any other bitter, in the manufacture of beer; hence the medicinal value of *extra-hopped* or *bitter* beer. The *tannic* acid in the strobiles also adds to the value of hops, particularly as causing the precipitation of vegetable mucilage, and consequently the clearing of beer. The hop is mentioned first by Pliny as one of the garden plants of the Romans, who, it appears, ate the young shoots as we eat asparagus; and, in fact, many country people in England do the same at the present day. It is a native of Europe and of parts of Asia, a doubtful native of Britain and of N. America. It is more extensively cultivated in s. England than in any other part of the world, but also largely in Germany, France, Flanders, and s. Russia; and now successfully and to a great extent in N. America; also in Australia and New Zealand.

The cultivation of the hop was introduced into England from Flanders in the time of Henry VIII., but did not become sufficient for the supply of the kingdom till the end of the 17th c. For some time after hops began to be used in brewing, a strong prejudice existed against the innovation; and parliament was petitioned against hops, as 'a wicked weed, that would spoil the taste of the drink, and endanger the people.'

HOPS are the produce of the hop-plant. The fruit is a little nut, not larger than a grain of mustard-seed, and between its outer shell and the kernel is a small quantity of a peculiar granular substance called *Lupuline,* which also exists as a sort of efflorescence on the surface of the scales themselves; much of the value of the hop depends on the abundance of this substance. The *lupuline* is not a mere powder, but each grain is a little organized cellular body, of an oval or round form, and, when seen under the microscope, having a reticulated surface. These lupulinic grains have been analyzed by many chemists. The following is the result of the investigations of Payen, Chevallier, and Pelleteau:

Volatile oil (oil of hops),	2·00
Lupuline (the bitter principle),	10·30
Resin,	50 to 55·00
Lignin,	32·00
Fatty, astringent, and gummy matters; osmazome, malic, and carbonic acids, several salts (malate of lime, acetate of ammonia, chloride of potassium, sulphate of potash), etc.	Traces.
	99·30

Hops thrive best in rather cool climates and in locations where there is free circulation of air without violent winds. They require a rich and moderately moist soil. The land if wet must be thoroughly drained. Ground for

HOP.

H. should be plowed and liberally manured in autumn, and plowed again in the spring. The surface must be finely pulverized and the plants set in straight rows, the hills eight ft. apart each way, on very rich land nine feet. As planting seed gives many different sorts propagation is effected by underground runners, or slips, which are cut in pieces five or six inches long, each piece having at least four eyes. They are sold by the bushel and two or three bushels will suffice for an acre. They must be kept in a celler, or covered with earth, until wanted for planting. Sets from male plants should be kept by themselves; enough to plant eight or ten hills per acre will be required. Planting should be done as soon as the ground is dry and warm in the spring. Furrows are usually plowed, but in mellow soil holes may be made with a dibble. Three sets are enough for a hill. They should be three or four inches apart and should be entirely covered with earth. Every eighth hill each way should be male plants. The most popular varieties in this country are the English Cluster, the Grape, and the Pompey. The latter is a large sort but in some localities rusts badly and is injured by insects.

The first season a crop of corn or potatoes can be grown between the rows. A light stake, eight ft. long, is to be placed in each hill of hops. Weeds and grass must be kept down by frequent cultivation and hoeing. When frost comes the vines are to be cut six inches from the ground and the hills covered with course manure. Only a small yield can be obtained the first year, and some growers neither set stakes nor try to obtain a crop. The second spring the earth should be carefully drawn away from the hills, the old vines and runners cut off with a sharp knife, and any grubs that are found destroyed. The ground is then to be plowed, the runners removed, earth hoed up to the plants, and the poles set in holes made with a crowbar or an augur. Poles should be 18 to 30 ft. long, according to the varieties of H., and two should be set for each hill, the tops inclining a little from each other in order to give free circulation of air. The horizontal system has several advantages: the following are its distinctive features. Except for the male plants, which should have tall poles in order that the pollen may be blown over the field, the poles are only eight ft. long and but one is used in a hill. Tarred twine connects the poles both lengthwise and across the field. It is tied only to the end poles and merely wound around the others. This method is said to give larger crops than can be grown on poles, the H. ripen earlier, are less liable to rust or be injured by high winds, the labor of picking is greatly reduced, and it is not necessary to cut the vines when the crop is harvested.

When the vines are three ft. high they should be wound around the poles with the course of the sun and, tied with bass matting or woolen yarn. This should be done when the sun is shining, as the vines will break if handled at morning or night. If strings are used, the vines must be wound around them when they reach above the poles.

Three strong vines are enough for a stake. If there are more they should be covered with earth. Each spring the ground must be plowed and weeds are to be kept down by constant cultivation.

Harvesting is to be done when the seeds get hard and become of a purple hue, about Sep. 1. When grown on poles the vines are cut about two ft. from the ground, the poles taken up and placed upon the supports under which large boxes are placed and into which the hops are picked by women and children. In horizontal yards the strings are loosened, thus lowering the vines, and the hops are picked into large baskets. Care must be taken to keep them free from stems and leaves. When picked, hops must be dried at once. There are various forms of kilns: temperature should be about 180°; time required for drying 8–22 hours. During the process sulphur is burned in order to bleach the hops. When half the stems will not bend without breaking, the hops are sufficiently dry. After two to four weeks they should be pressed into bales of 150 to 200 pounds. They must be kept dry and in a well ventilated place. The fibre of the vine is sometimes, though rarely, used for manufacturing purposes. The yield varies from less than 1,000 to 2,500 pounds per acre, and the price fluctuates from 5 to 50 cents a lb., and has reached $1.00. N. Y., Wis., and Cal. are the largest H.-producing states.

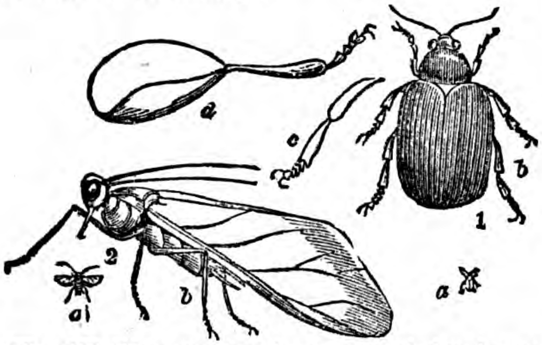
HOPE, n. *hōp* [Sw. *hopp*, hope: Ger. *hoffen;* Dut. *hopen*, to expect: Dut. *hoop;* AS. *hopa*, hope]: the desire of good, accompanied with some degree of expectation of obtaining it, or with a belief that it is attainable; anticipation of future good; the confident assurance of something future but certain, as the divine promises; the person who or thing which gives hope; trust; opinion or belief not amounting to certainty: V. to cherish a desire of good, with some degree of expectation of obtaining it; to trust in with confident anticipation of good; to place confidence in another. HO′PING, imp. HOPED, pp. *hōpt*. HOPE′FUL, a. *-fûl*, full of hope; having qualities promising success. HOPE′FULLY, ad. *-lĭ*, in such a manner as to raise hope; with confident expectation. HOPE′FULNESS, n. the state or quality of being hopeful; a likelihood of success. HOPE′LESS, a. without hope; being without pleasing expectation; despairing. HOPE′LESSLY, ad. *-lĭ*. HOPE′LESSNESS, n. *-nĕs*, the state of being hopeless or in despair. HO′PINGLY, ad. *-lĭ*, with hope. FORLORN-HOPE—which see.—SYN. of 'hope, n.': expectation; confidence; assurance; desire.

HOPE, *hōp*, ALEXANDER JAMES BERESFORD BERESFORD, D.C.L., LL.D.: 1820, Jan. 25—1887, Oct. 20; b. London, England: statesman. He was educated at Harrow School and Trinity College, Cambridge; member of parliament for Maidstone 1841–52, 1857–59, for Stoke-upon-Trent 1865, and for Cambridge Univ. 1868 till his death, pres. of the Royal Institute of British Architects 1855-67; and author of numerous papers and articles on religion, ecclesiastical architecture and politics; also of the novels *Strictly Tied Up* (1880) and *The Brandreths* (1882). During the American civil war he was chairman of the Southern Independence Assoc., liberally aided the Confederacy, and presented Foley's statue of 'Stonewall' Jackson to the state of Va. 1875. He married a sister of the present (1889) Marquis of Salisbury.

HOPE, THOMAS: distinguished author and patron of art, ancient and modern: abt. 1770–1831, Feb. 3; b. London. While still a youth, he travelled over a large portion of Europe, Asia, and Africa, and collected many drawings, chiefly of buildings and sculptures. In England, he attracted attention first by the splendid decorations which he bestowed on the interior of his mansion in Duchess Street, Portland Place, London, a description of which appeared in his book *Household Furniture* 1805, a work that completely revolutionized the taste of Britain. In 1809, he published *Costume of the Ancients*, the influence of which was great. His essay on the *Architecture of Theatres* 1809, also deserves mention. Three years afterward appeared *Modern Costumes*, and 1819, *Anastasius, or Memoirs of a Modern Greek at the Close of the 18th Century*—his masterpiece. It was published anonymously, and was said by many people to be a production of Lord Byron's, who was greatly flattered by the rumor. It is certainly a striking and erudite performance, though tedious and obscure in many places. It lacks the dramatic *vis* of a genuine work of genius, and is now little read. Other works of H. are his essay *On the Origin and Prospects of Man*, heterodox but eloquent piece of speculation; and *Historical Essay on Architecture;* both published posthumously.

HOPE AND COMPANY: firm of bankers established in Amsterdam, Holland, by Henry Hope, Scotchman, in the 17th c., and since allied by marriage and blood with several of the most aristocratic families of Great Britain; also connected with the great Barings house by marriage and business relations. The Hopes and Barings negotiated the great loan with France after the withdrawal of the allied armies, and the former have had large financial relations with Holland and Russia. being at one time a creditor of Russia to the extent of $25,000,000. The last representative of the Hope family in the firm was Adrian Elias Hope, born 1845, April 8.

HOP FLEA (*Haltica concinna*): very small coleopterous insect, not quite one-tenth of an inch in length, which often does much mischief in hop-plantations in spring, devouring the tender tops of the young shoots. It is of the same genus with the turnip-flea (sometimes called turnip fly), so destructive to turnips.



1. Hop Flea (*Haltica concinna*): *a*, natural size; *b*, magnified; *c*, a fore-leg; *d*, a hind-leg.
2. Hop Fly (*Aphis Humuli*): *a*, natural size; *b*, magnified.

HOP FLY (*Aphis humuli*): destructive insect which attaches itself to the under side of the leaves of the hop plant and feeds upon its juices. It has been known in England about a century, and made its first appearance in N. Y. hop yards 1863. In some seasons it has destroyed the crop over large areas. The H. F. was supposed to hibernate upon the roots, and various ineffectual applications to the soil were made to exterminate it. Recently it has been discovered that the eggs are laid upon the twigs of plum trees, whence the insects migrate to the hop plants. Their multiplication may be largely prevented by spraying with kerosene emulsion early in the spring all plum trees near hop yards, and by burning the vines as soon as the hops are harvested. Infested vines are to be thoroughly sprayed with the emulsion as soon as the insects appear. Immense numbers of the insects are destroyed by natural enemies, and some seasons they are kept in check thereby.

HOP FROTH-FLY, or **Hop Frog-fly** (*Amblycephalus interruptus*): species of Froth-fly (q.v.) which sometimes appears in great numbers in hop-grounds, and does considerable mischief. The perfect insect is about a quarter of an inch long, of yellow color, variegated with black. It frequents hedges and grassy places as well as hop-plantations.

HÔPITAL', Michel de L': see L'Hôpital.

HOPKINS, *hŏp'kinz*, Edward: 1600–1657, Mar.: b. Shrewsbury, England: statesman. He engaged in mercantile business in London, removed to Boston 1637, soon afterward settled in Hartford, was gov. of Conn. every even year 1640–54, aided in establishing the union of the New England colonies 1643, returned to London, and became commissioner of the admiralty and member of parliament. He bequeathed a large part of his estate to Hartford, New Haven, Hadley, and Cambridge for educational purposes.

HOP'KINS, Esek: 1718–1802, Feb. 26: b. Scituate, R. I.: naval officer. He was commissioned brig.gen. in the army early in the revolutionary war, and appointed by congress the first commander-in-chief of the American navy 1775, Dec. He organized a fleet of 4 ships and 3 sloops 1776, Feb., captured a number of forts on the Bahamas, and two British vessels off Block Island; was charged with inactivity on the s. coast and acquitted by the naval committee 1776, June; began organizing another fleet, again had charges preferred against him, and failing to answer the summons for trial was dismissed from the service 1777, Jan. 2.

HOP'KINS, John Henry, d.d., d.c.l., ll.d.: 1792, Jan. 30—1868, Jan. 9; b. Dublin: Prot. Episc. bishop. He came to America with his parents 1800, assisted Alexander Wilson in illustrating his *Ornithology*, engaged in the iron business in w. Penn., was admitted to the bar at Pittsburg 1818, practiced successfully till 1823, when (Dec. 24) he was ordained deacon in the Prot. Episc. church. The same year he became priest, and 1824 rector of Trinity Church, Pittsburg, of whose new building he was also architect. Failing to gain his bishop's consent to found a seminary at Pittsburg, he resigned and became asst. rector of Trinity Church, Boston, 1831. The next year he was consecrated the first Prot. Episc. bp. of Vt.; became rector of St. Paul's Church, Burlington: and subsequently established there the Vt. Episcopal Institute.—His son, John Henry H., d.d., b. Pittsburg, 1820, Oct. 28, graduated at the Univ. of Vt. 1839 and the Gen. Theol. Seminary 1850, founded and edited the *Church Journal* 1853–68, ordained priest 1872, became rector of Trinity Church, Plattsburg, N. Y., 1872, and of Christ Church, Williamsport, Penn., 1876; trustee of the Gen. Theol. Seminary, and member of the board of missions.

HOP'KINS, Johns: 1795, May 19—1873, Dec. 24; b. Anne Arundel co., Md.: philanthropist. He was of Quaker parentage and education, carried on the wholesale grocery business in Baltimore 1822–47, and afterward was engaged in banking and real estate and railroad operations. He acquired large wealth, out of which he endowed the Johns Hopkins Univ. on his Clifton estate near Baltimore with $3,500,000 (opened 1876) and the Johns Hopkins Hospital, free to all, with $4,500,000 (opened 1889, May), gave the city of Baltimore a public park, established an orphanage for colored children, and gave largely to other benevolent purposes.

HOP'KINS, Mark, M.D., D.D., LL.D.: 1802, Feb. 4—1887, June 17; b. Stockbridge, Mass.: educator. He graduated at Williams College 1824, and at the Berkshire Medical School 1829, practiced a few months in New York, was elected prof. of moral philosophy and rhetoric at Williams College 1830, was licensed to preach 1832, succeeded Rev. Dr. Edward D. Griffin as president, and assumed the newly-created chair of moral and intellectual philosophy 1836, took also the chair of Christian theol. 1858, resigned the office of pres. but retained his professorships and pastorate 1872, and resigned the latter 1883. He was prés. of the A. B. C. F. M. from 1857 till his death. His publications include *Mystery* in the *American Journal of Science and Art* (1828); *Lectures on the Evidences of Christianity*, Lowell lecture course (1846,64); *Miscellaneous Essays and Discourses* (1847); *Lectures on Moral Science* (1862); *Baccalaureate Sermons and Occasional Discourses* (1863); *The Law of Love, and Love as a Law; or, Christian Ethics* (1869); *An Outline Study of Man* (1873); *Strength and Beauty* (1874), re-issued as *Teachings and Counsels* (1884); and *Scriptural Idea of Man* (1883). He received the degree D.D. from Dartmouth College 1837, and Harvard College 1841; and LL.D. from the Univ. of the State of New York 1857, and Harvard Univ. 1886.

Dr. H. was one of the most distinguished educators of this century. As a college administrator he was unsurpassed. To great learning and profound thought he added a practical wisdom, a marvellous judgment of men, and an unusual symmetry of character. His deep moral nature and strong religious feeling were developed in beneficent influence over his students, many of whom in after years deemed their personal association with him one of the chief elements in their education.

HOP'KINS, Samuel, D.D.: 1721, Sep. 17—1803, Dec. 20; b. Waterbury, Conn.: theologian, from whom the special system of Calvinism known as Hopkinsianism is named. Having graduated at Yale College 1741, he studied theology with Jonathan Edwards, and 1743–69 was Congl. pastor at Housatonic, now Great Barrington, Mass. He then removed to Newport, R. I., where he was pastor of a small Congl. church 1770—abt. 1800, and where he died. His writings consist of a life of Pres. Edwards, sermons, addresses, a work on the millennium, and *System of Theology*, republished, 3 vols., Boston 1852. He is said to be the hero of Mrs. Beecher Stowe's *Minister's Wooing*. He was remarkable for his simplicity, earnestness, and persevering industry, and his peculiar theological doctrines were a source of controversy for a century. Dr. Hopkins had an acute intellect, and a high ethical and spiritual tone of thought. He is to be held in honor as among the first in America to attack slavery on the ground of Christian morality, and to organize political action against it.

HOPKINSIANISM, *hŏp-kĭn′si-an-ĭzm*, has been summed up as follows.—1. God is the efficient cause of all the heart's volitions, good or evil. 2. The guilt of Adam's first sin is on Adam alone, and is not imputed to his descendants, whose moral corruption consists in their aversion to that goodness of which they are fully capable. 3. All holiness consists in disinterested benevolence. 4. All sin consists in selfishness. 5. Reconciliation and redemption are distinct works of God for sinful men; reconciliation opens the way of grace through Christ; redemption applies to individuals the saving grace that is in Christ. 6. Effectual calling to salvation consists in the willingness to be saved by God's grace in Christ: it is induced in the sinner's heart by God. 7. The righteousness of Christ is the only ground of the sinner's justification, yet it is not, in any strict or proper sense, imputed to the sinner. 8. Repentance precedes in time the act of faith in Christ.—A point in this system which drew popular notice was, the duty of loving God irrespective of the eternal reward of heaven secured thereby. This, and other points, have been distorted even to caricature by theological opponents. The system doubtless exerted a modifying force on theology; but as a whole, it is now merely a flood-mark of past controversy.

HOP′KINS, STEPHEN, LL.D.: 1707, Mar. 7—1785, July 19; b. Scituate, R. I.: signer of the Declaration of Independence. He was of Quaker parentage, was bred a farmer, inherited a large estate, removed to Providence 1731, was elected member of the assembly 1732, and annually re-elected till 1738, resumed his seat and became speaker 1741, appointed justice of the court of common pleas 1736, and its chief justice 1739, chief justice of the superior court 1751–54, gov. with a single interruption 1754–68, member of congress 1774–78, and chancellor of R. I. College (now Brown Univ.) several years.

HOPKINSON, *hŏp′kĭn-son*, **FRANCIS**: 1737, Sep. 21—1791, May 9; b. Philadelphia: signer of the Declaration of Independence. He graduated at the College of Philadelphia 1763, was admitted to the bar 1765, became collector of customs at Newcastle 1772, settled in Bordentown, N. J., was a member of the N. J. provincial council 1774–5, of congress 1776–7, served on the committee that drafted the articles of confederation, and under the new constitution was the first head of the navy department. He was U. S. judge of admiralty for Penn. 1779–89, and U. S. dist. judge for Penn. 1790 till death. H. was a painter, musician, musical composer, scientist, poet, and author—his best known work being the humorous poem *The Battle of the Kegs* (1778).—His son JOSEPH H., 1770, Nov. 12—1842, Jan. 15, b. Philadelphia, and graduated at the Univ. of Penn. 1786, was eminent as a lawyer, U. S. judge for the e. dist. of Penn. 1828 till death, pres. of the Acad. of Fine Arts, vice-pres. of the American Philosophical Soc., and author of the national hymn *Hail Columbia!*

HOPKINSVILLE, *hŏp'kĭnz-vĭl*: city, cap. of Christian co., Ky.,; on Little river and the Louisville and Nashville railroad; 71 m. n.w. of Nashville. It is the seat of S. Ky. College and of the state insane asylum, is regularly laid out and well built, and contains an acad., two seminaries, 8 churches, 1 national bank (cap. $64,000), 3 state banks (cap. $395,000), botanical garden, public library, city hall, flour and planing-mills, coach and plow factories, and two newspapers. It is in a rich agricultural, coal, and iron region. Pop. (1670) 3,136; (1880) 4,229.

HOPKINTON, *hŏp'kĭn-ton*: village in H. tp., Middlesex co., Mass.; on the H. Milford and Woonsocket railroad; 15 m. e.s.e. of Worcester, 30 m. w.s.w. of Boston. It has 4 churches, 1 national bank (cap. $150,000), 1 savings bank, large boot and shoe factory, and 1 newspaper. Pop. tp. (1880) 4,602.

HOPLITE, n. *hŏp'līt* [Gr. *hŏplītēs*—from *hoplon*, a weapon]: a heavy armed soldier of anc. Greece.

HOPLOPHOR'IDÆ: see GLYPTODON: ARMADILLO.

HOPPER, n. *hŏp'pėr* [from *hop*, to take short leaps: Dut. *haperen*, to stammer, to stutter]: the funnel or trough through which grain passes into a mill to be ground—so called from its jumping, shaking motion; a vessel in which seed-corn is carried; a conical vessel suspended from the ceiling, containing sand and water, for the use of the cutter in glass.

HOPPER, *hŏp'ėr*, ISAAC TATEM: 1771, Dec. 3—1852, May 7; b. Deptford, Gloucester co., N. J.: philanthropist. He removed to Philadelphia when a boy, learned the tailor's trade with an uncle, joined the Soc. of Friends, and through his early and active membership in the Penn. Abolition Soc. soon became widely known as a staunch friend of the colored race. The zeal and success with which he fought the men that came to Philadelphia and vicinity intent on kidnapping free negroes and runaway slaves, added greatly to his fame among the early abolitionists at the north and the slaves in the south; while his singular devotion to the sick and poor during the yellow-fever epidemic 1793 gave him general popularity at home. The large measure of confidence that he inspired among all classes in Philadelphia was attested by the facts that he became overseer or supt. of a school founded by Anthony Benezet for colored youth, founder and sec. of an assoc. for securing employment for the poor, inspector of the penitentiary, arbitrar between oppressive landlords and their tenants, friend and guardian of ill-treated apprentices, equity advisor to all sorts of people in trouble, and a particularly skilful worker among the insane. Though a poor man he would never accept pay for his humane works, and though his family was large his home almost constantly sheltered Friends in distress. No form of suffering or affliction was too humble or dangerous for his prompt attention: no reform too great for him to undertake; no risk for human relief too threatening for him to assume. Previous to the division in the Soc. of Friends (1827–8) he had affiliated with the extreme orthodox members; but his strong anti-slavery convictions led him to an admiration of Elias Hicks (q.v.), and when the rupture was completed he gave his adhesion to the branch known as Hicksites. In this new assoc. he was induced to remove to New York and take charge of a book-store opened by the Hicksite Friends 1829, and after a brief visit to England and Ireland he began in New York the great work of his life—that in connection with the Prison Assoc., while relaxing none of his energy in behalf of fugitive slaves. He was an early co-laborer in William Lloyd Garrison's anti-slavery movement, begun 1831, and for 15 years he lived in constant risk—yet fearless—of his life, was the subject of frequent legal persecution, and was denounced in private and public and often by the Friends themselves. In 1841 he was appointed treas. and book-agent of the Anti-Slavery Soc., and 1845 resigned these offices to apply himself wholly to the work of the Prison Association. He secured the act of incorporation for the assoc., and as its agent made himself the friend, advisor, and benefactor of convicts, visiting them in prison, looking after their families during the terms of their incarceration, obtaining pardons in deserving cases, and seeking homes and employment for them after their discharge. Gov. John Young once told him that he would cheerfully pardon any convict whom he (H.) conscientiously believed should be pardoned. While he thus labored for male convicts, one of his daughters, Abby H. Gibbons, co-operated with him till impelled to apply her energies to the similar unfortunates of her own sex; and through her exertions 'The Isaac T. Hopper Home for Discharged Female Convicts' was erected in New York and placed under her superintendence.

HOPPIN, *hŏp'in*, AUGUSTUS: artist and author: b. Providence, R. I., 1828, July 13. He graduated at Brown Univ. 1848, practiced law in Providence, studied art in Europe 1854–5, and became a draughtsman on wood for book illustrations. He illustrated *The Potiphar Papers* (1853), *Nothing to Wear* (1857), *Mrs. Partington's Sayings*, and *The Autocrat at the Breakfast Table;* and published *Carrot Pomade* (1864), *On the Nile* and *Ups and Downs on Land and Water* (1871), *Crossing the Atlantic* and *Jubilee Days* (1872), *Hay Fever* (1873), *A Fashionable Sufferer* (1883), and *Two Compton Boys* (1885).

HOPPLE, v. *hŏp'l* [Dut. *hobbelen*, to jolt, to stammer: Scot. *hobbil*, to mend shoes in a bungling manner]: to tie the feet near together to prevent leaping. HOPPLING, imp. *hŏp'lĭng*. HOPPLED, pp. *hŏp'ld*. HOPPLES, n. plu. *hŏp'lz*, fetters for the legs of horses.

HOPPO, n. *hŏp'pō* [Chinese]: in *China*, an overseer of commerce; a collector; a tribunal appointed to collect the public revenue arising from trade and navigation.

HOPS: see Hop.

HOP-SCOTCH: see under Hop 1.

HOP-TREE [bot. *ptelea*, elm; *trifoliata* three-leaved], known also as Shrubby Trefoil, or Wingspeed, or Wafer Ash: American shrub of the family *Rutaceæ* (rue), found from Penn. to Wis. and in the south; usually 6 to 10 ft. high, but under thorough cultivation from 30 to 40 ft. The leaves are in clusters of three, pointed, and with a downy surface when young; the flowers appear at the ends of new shoots, small and greenish; and the fruit has two cells, each containing a seed, surrounded by a broad wing. The H. has a neat appearance as an ornamental growth, but is backward in the spring. Its fruit is substituted for the true hop by beer brewers, and its leaves and tender shoots made into an infusion are used as a remedy for worms in children.

HOR, *hawr*, Mount [Arab. *Jebel Neby Harun*]: twin-peaked mountain in Arabia Petræa, belonging to the Jurassic chain of Shera, Seir, or Edom; on the e. edge of the valley of the Arabah, 4,800 ft. above the sea. It was the scene of the death of Aaron the high priest, and his tomb, a square Saracenic structure, is shown on one of the summits. This locality is referred to in Numb. xx. 23, xxxiii. 37, and was the first resting-place of the Israelites after they left Kadesh. See Numb. xxxiv. 7, 8, for another summit of the same name.

HORACE, *hawr'ĕs* (HORATIUS FLACCUS, *hō-rā'shĭ-ŭs flăk'ŭs*), QUINTUS: renowned Roman satirist and lyrist: B.C. 65, Dec. 8—B.C. 8, Nov.; b. Venusia, in Apulia—in the country now called the *Basilicata*, lately forming part of the kingdom of Naples. His father, who had been born a slave, but manumitted before the poet's birth, was a *coactor* (collector of money for tax-gatherers and bankers), by which employment he had become a proprietor on a modest scale in his native district. Early seeing the genius and promise of his son, he resolved to devote his whole means to his education, and removing to Rome for the purpose, he gave him the culture usually bestowed on children of the highest classes. Having finished his youthful studies at Rome, he was engaged on higher ones at Athens, when the assassination of Julius Cæsar threw the whole Roman world into confusion, and dragged H. himself—in his 21st year—into the civil war which followed. Brutus coming with Cassius to Greece, made H. a tribune, and he served with the republican leaders in that rank until the fatal field of Philippi ended their campaign. Brutus and Cassius destroyed themselves. H. made his submission, and returned to Rome. With what was left of his patrimony he bought the office of public scribe, and while living by this humble place, applied his energy to literary creation. Thoroughly accomplished in Greek and Roman literature, he set himself to two great tasks—the naturalization in Latin of the Greek lyric spirit, and the perfect development of the old Roman satire. It is his complete artistic success in both objects which has made him one of the most influential writers of the world, and which will secure his fame as long as order or culture exist.

H.'s first known labors were satires and epodes—the epodes being imitations of the Greek satirist Archilochus. But it is probable that he early began to imitate the other great Greek lyrists; and it is certain that his first success was not from the public but from the private circulation of his works. He made the friendship of Virgil, whose rise preceded his own, and of Varius; and Virgil and Varius introduced him to Mæcenas when he was about 26 years old. That great Etruscan noble and friend of Augustus became the good genius of the poet's life. He endowed him—at some period not exactly known, but before B C. 33—with a farm near Tivoli, in the Sabine country, established his independence, fostered his fame, sought his intimacy, loved, honored, and encouraged him as much as one man could another. The friendship of Mæcenas led to that of Augustus, and H. through his life (he died at the age of 57) had the warm regard of the greatest persons of his time. He shows his gratitude for such favor in many passages of his poems, but he is never servile, and he compliments the emperor himself only on those features of his reign which have tended to secure him the gratitude, or, what was not less needed, the forgiveness, of posterity.

It is impossible here to discuss the vexed question of the chronology of H.'s poems, or to notice a fiftieth part of what has been written on it. But though we cannot be sure of the chronology of the poems, they themselves give us ample means for judging of the character of the poet. Even his personal appearance is familiarly known to us. He was a little, round, dark-eyed man, prematurely gray-haired, and inclined to corpulence; in dress somewhat slovenly, and apt to be abstracted in his gait and manner. He was kindly, friendly, and honorable—irascible, but easily appeased—of amorous and generally sensual temperament, yet fully sensible of both the dignity and the prudence of moderation. His philosophy was Epicurean, like that of most Roman men of the world of his age; but he had both an eye and a heart for the noble in history and in life, and his most discerning readers cannot but see that there was a latent fund of earnestness and even piety in his nature, to which his poetry never gave full expression. He was capable of high moral beliefs and ideals. The real key to his genius is found in studying him as essentially a philosophical wit and moralist, who had an exquisite faculty for lyrical creation, and was a finished artist by dint of practice in it, but who primarily belonged to the philosophical rather than to the poetic class of minds. Some strict modern critics have doubted his being a poet at all, which doubt, since he could produce all the effects of poetry, is plainly nonsense. The latest criticism, however, decidedly tends to place his lyrical works—as imitations of the Greek, and echoes of the natural notes of an earlier and more poetic age—farther below his *Satires* and *Epistles* than it was formerly customary to rank them. Meanwhile, this does not rob the *Odes* of their value, nor of their charm, nor of their merit. Their value, as representing an older literature which exists only in fragments, is immeasurable. Their charm, as breathing now all the gayety, now all the sadness, of the ancient pagan mind, is irresistible. And their merit, even as imitations, implies a delicacy of insight, a fineness of touch, a power of minute finish, shown by very few writers in the whole history of art. They are, indeed, perpetual models of construction, valuable equally to poets of every school, and were not less carefully studied by Wordsworth than by Pope. Great, however, as is the merit of the *Odes*, that of the *Satires* and *Epistles* is greater. The native Roman satire—an indigenous product of Italy, as Casaubon has irrefragably established—was developed by H. into a branch of composition peculiarly his own; and in his own species of it he has never had a rival. He ridicules the follies of the world from the point of a man of the world, playing round vice like a picador round a bull; and though his morality does not rise above the level of a prudential moderation abhorrent of extremes, he enforces this with so much soundness dramatic liveliness, and gay vivacious hmorous wit, that the pulpit has profited by him not less than the author's study, and he has been the favorite of ecclesiastical dignitaries and statesmen, while being also the pocket-companion of men of letters and epigrammatists. The *Epistles* contain the graver element of the *Satires* in still greater perfection, and with the addition of a fine vein of personal emotion and affection, tinged occasionally with the melancholy of advancing life, which, on the whole, makes them the most valuable of H.'s works.

The literature of H. in modern Europe is enormous, and can only be glanced at here. The *Editio Princeps* appeared Milan 1470, in 4to, and was followed by a long line of editions. In modern times, Orelli has taken a leading place as Horatian editor, and since him, Dillenburger has been justly popular; while England has contributed to the subject, among many other works, the valuable *Horatius Restitutus* of Tate, and the sumptuous volume of Dean Milman. Among English translators of H., in whole or in part, are Ben Jonson, Milton, Atterbury, Pope, Warren Hastings, and Cowper, while Pope's *Imitations* occupy a distinguished place of their own. The best known translation of the whole of H. in English, is that of Francis, but his day is fast going by. Excellent translations have been issued in our own time by Sir T. Martin, Mr. Robinson, Lord Ravensworth, Lord Lytton, and Prof. Conington; and a curious, but powerful one by Prof. Newman, whose theory of translation, however, has led him into frequent oddities and singularities.

HORAL, a. *hōr'ăl* [L. *hora*, an hour]: relating to an hour or hours. **Hor'ally**, ad. *-lĭ*. **Horary**, a. *hōr'ă-rĭ*, relating to or denoting the hours; in *bot.*, lasting about an hour.

HORATII, *hō-rā'shĭ-ī:* three Roman brothers born at the same birth who became champions of Rome in the war against Alba Longa and personally fought the Curiatii, three Alban brothers also born at one birth. The legend is that the mothers of the boys were twin sisters and gave birth to them the same day and hour. The encounter occurred about B.C. 667, on a plain between the camps of the Roman and Alban armies, a few miles from Rome. The two kings had agreed that the issue between them should be settled by the personal combat of the brothers of the two families. In the first encounter two of the H. were killed and all the Curiatii wounded. The surviving Horatius then pretended flight, and when the Curiatii became separated in the attempt to cut off his escape in various directions, he turned suddenly and slew them one by one. Returning to Rome with the mantle of one of the Curiatii, Horatius was reproached by his sister for having killed her betrothed, whereupon he killed her. For this he was condemned to death, but the people spared his life on his passing beneath the yoke. Subsequently he was sent to destroy Alba Longa and transport all its inhabitants to Rome.

HORDE, n. *hōrd* [F. and Ger. *horde*, a horde, a clan: Alb. *hordi;* Turk. *ordú*, a camp, a tribe]: a body of wandering or migratory people dwelling in tents or wagons: V. to live together like migratory tribes. **Hord'ing**, imp. **Hord'ed**, pp.

HÖRDE, *hör'dė:* growing town of Westphalia, 33 m. s. of Münster. Near it are coal-mines. Nail-making is carried on. Pop. (1880) 12,458.

HORDEIN, or HORDEINE, n. *hŏr'dē-ĭn* [L. *hordĕŭm,* barley]: peculiar substance that can be extracted from barley, but which is merely a mixture of starch, cellulose, and a little nitrogenous matter of unknown composition.

HORDEOLUM, n. *hŏr-dē'ŏ-lŭm* [a dim. of L. *hordĕŭm,* barley]: a small, hard, painful boil developed in the margin of the eyelid, so called from its likeness in size and hardness to a small barley-corn; the stye.

HOR'DEUM: see BARLEY.

HORDEUM DECORTICATUM, *hawr'dē-ŭm dē-kawr-tĭ-kā'tŭm:* in *phar.,* pearl barley; the husked seeds of *Hordeum distichum.* It is used prepare decoction of barley, made by washing two ounces of barley with cold water, and pouring 30 ounces of boiling water over it, for a mild nutritive and demulcent drink.

HO'REB, MOUNT: see SINAI.

HOREHOUND, or HOARHOUND, n. *hōr'hownd* [AS. *harahune,* horehound—from *har,* hoary, gray; *hune,* consumption.—It is also said that *hound,* from *hune,* means 'strong-scented], (*Marrubium*): genus of plants of nat. ord. *Labiatæ,* having a tubular 10-ribbed calyx, with 5 or 10 spiny equal teeth, 4 stamens included in the corolla, the upper lip of the corolla erect, the lower lip 3-cleft. The species are mostly perennial, herbaceous plants, natives of s. Europe and the East. One species, the COMMON or WHITE H. (*M. vulgare*), is found generally throughout Europe, except in the more northern regions, growing in waste place waysides, etc. It is about 1—1½ ft. high, bushy,

Horehound (*Marrubium vulgare*).

with roundish, ovate, crenate, wrinkled leaves, and almost globose whorls of white flowers. The whole plant has a whitish appearance, from the down with which its leaves are covered. It has an aromatic but not very agreeable smell. It is tonic, stimulant, and laxative, and is much used in coughs, being a popular remedy, safe and efficacious. It was formerly used also in affections of the womb and of the liver. It is administered in the form of an infusion, or made into a syrup with sugar, and sometimes the syrup is candied. The name H. belongs also to another plant, of closely allied genus, *Ballota nigra,* sometimes called Black H., a fetid plant, also of the order *Labiatæ.* It has a more disagreeable odor, but nearly resembles the White H. in taste, and has similar medicinal properties.—A third plant, *Lycopus Europæus,* a diandrous plant of the same nat. ord., sometimes called **Water Horehound**, is known also as Gypsy-wort.

HOR'ICON, Lake: see George, Lake.

HORICON Lake, *hŏr'ĭ-kon:* in Wis.; extends from the n. part of Dodge co, to the s. part of Fond du Lac co.; 15 m. long, 5 miles wide; outlet, Rock river, at the s. end. It is a shallow, grassy basin, known formerly as Winnebago marsh.

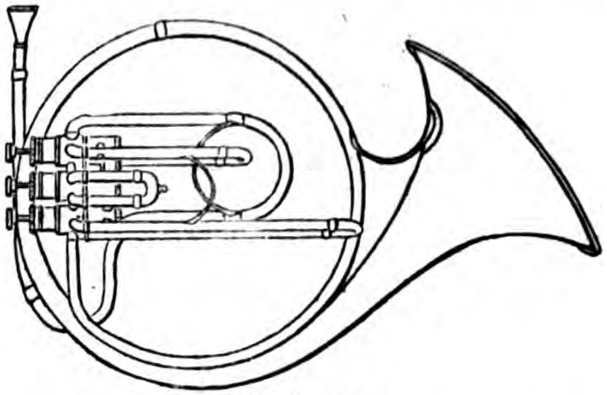
HORIZON, n. *hŏ-rī'zŭn* [Gr. *horīzōn,* that which terminates—from *horos,* a boundary]: the circular line where the earth and sky seem to meet, called the *sensible horizon;* the great circle dividing the visible and invisible heavens into two equal parts is called the *rational horizon:* it is the circle formed by a plane passing through the centre of the earth, parallel to the sensible horizon, and produced to meet the heavens. **Horizontal**, a. *hŏr'ĭ-zŏn'tăl,* on a level; on a line with the horizon; the opposite of *perpendicular* or *vertical.* **Hor'izon'tally**, ad. *-lĭ.* **Hor'izontal'ity**, n. *-ĭ-tĭ,* state of being horizontal. **Artificial horizon**, a reflector whose surface is perfectly horizontal, used to observe altitudes. **Horizon-glass**, a glass fixed in front of the telescope of a reflecting astronomical instrument, whose lower part is a mirror, and upper transparent.

HORMUZD: see Ormuzd.

HORN, n. *hŏrn* [Goth. *haurn;* Icel. *horn;* Dut. *horen;* L. *cornu;* Bret. and W. *corn,* a horn]: hard substances projecting from the heads of certain animals (see Horns); wind musical instr. originally made of a horn (see below): a drinking-cup; the two ends of the waning or waxing moon; in *Scrip.*, a symbol of power; the feelers of certain insects. **Horny**, a. *hŏr'nĭ,* made of horn; hard; callous. **Hornless**, a. *hŏrn'lĕs,* without horns. **Horned**, a. *hŏrnd,* having horns; crescent-shaped. **Hornedly**, ad. *hŏrn'ĕd-lĭ.* **Horn'edness**, n. *-nĕs.* **Horner**, n. *hŏr'nėr,* one who works in horn. **Horning**, n. the appearance of the crescent moon; in *Scots law,* a certain process to compel a party to execute a judgment or decree of the court. **Hornbeak**, n. *-bēk,* a bird. **Hornbug**, n. a kind of beetle. **Hornfish**, n. the gar-fish or sea-needle. **Horn-mad**, in *OE.*, a supposed corruption of *harn-mad*—that is, brain-mad. **Horn-**

POCK in *pathol.*, an old name for a mild variety of small-pox, in which the eruption, never confluent, consists of pustules, hard to the touch, and called seedy or horny; called also stone-pock. HORNSTONE, n. a variety of quartz resembling flint, but more brittle, used for snuff-boxes, handles of knives and forks, etc.; chert. HORNSLATE, n. a mineral. HORNBLENDE, n. *-blĕnd* [Ger. *blende*, that which blinds—from *blenden*, to dazzle]: a mineral so called from its horn-like cleavage and peculiar lustre; or so named from *blind* because it contains no ore; a rock-forming mineral allied to augite (q.v.), and containing 40 to 60 per cent. of silica, with variable quantities of alumina, lime, oxide of iron, soda, potash, and fluorine. It is found in granite, syenite, and other igneous rocks which contain quartz or free silica, and is abundant particularly as a constituent of syenite. It is found sometimes in considerable masses, and even in beds of slaty structure (*Hornblende slate*). COMMON HORNBLENDE is generally green or black, more rarely brown or gray: it contains a large proportion of protoxide of iron; is generally massive, but sometimes crystallizes in oblique four-sided, or in six-sided prisms. The crystallized hornblende is sometimes called *Black Schorl*, and is capable of being made into ornaments. HORNBLEN'DIC, a. *-blĕn'dĭk*, composed chiefly of hornblende; pertaining to. HORN'PIPE, n. musical instrument, which consisted of the common wooden pipe with the necessary holes for producing the notes, and with a horn on each end. The performer blew into one of the horns, and the sounds of the pipe proceeded out of the other. In the n.w. of England, where mostly this instrument was found, it was used to accompany a national dance also called the Hornpipe, still a favorite, especially among sailors. The melody of this dance is always in triple time—that is, in $\frac{3}{2}$, or $\frac{3}{4}$, and sometimes in $\frac{3}{8}$ time—and it consists of two parts of four or eight bars each, with repeats. The movement of the dance is lively. HORN-SILVER, the native chloride of silver, a valuable ore. HORNED-HOG, the baby roussa (q.v.). HORNED-HORSE, the gnu (q.v.). TO DRAW IN THE HORNS, to withdraw from any position or attitude of assertion. TO PUT TO THE HORN, in *Scots law*, to denounce as a rebel, an outlaw, or a fugitive from justice—so called from the ancient formality of blowing a horn; to charge to pay a debt, or perform an act under a decree. TO WEAR THE HORNS, said of a married man whose wife is unfaithful to him; a submissive cuckold. HORN OF PLENTY, the CORNUCOPIA, which see. HORNS OF A DILEMMA [see DILEMMA]: a phrase taken from logical parlance: a difficulty of such a kind that, in whichever way met, the result is a disagreeable one; a strait between the choice of two evils, or two disagreeable things.

HORN, sometimes FRENCH HORN: musical instrument, developed out of the hunting-horn (hence the French name *Cor de Chasse;* Italian *Corno de caccia;* German *Waldhorn*). Its form is now that of a long tube of brass, with a large bell-shaped ending. For greater convenience the tube is coiled in a circle, with an oblong piece in the middle called the tuning slide, to adjust the pitch to that of other instruments. It is sounded by means of a mouth-piece, in form like a little hollow cup. The thinner the sheet-brass is of which the H. is made, the more easily can the sound be produced. The sounds obtained on the H. are the harmonics of the sound of its whole length, a fundamental sound which cannot be produced by the mouth. As those sounds form only a limited scale, the notes lacking are artificially made, by the hand being inserted into the bell, so as to flatten a higher note down to a lower one. These flattened notes are called stuffed notes, as the sound of them is muffled. The H., in its natural state, can be played only in one key; but by means of crooks, from A in alt down to C, it can be transposed into any key between and including those. When at its greatest length, the H. measures, from the mouth-piece to the end of the bell, 16 ft. The music is always written in the key of C, with the key of the composition marked at the beginning of each movement; thus, Corno in D, etc., guides the performer as to the crooks he must use, in order to play the notes in the key indicated. The stuffed notes being very defective in quality of sound, in comparison with the great beauty of the open notes, many inventions have been, from time to time, tried to remedy them. The most successful invention is the valve-horn, constructed so that the performer can, by means of three valves, lengthen or shorten the tube, so as to produce any note in the chromatic scale, as a harmonic of the length of the tube, and consequently all of the notes are of the same quality of sound, and open notes. The valve-horn is now generally used as a solo instrument with greater effect than the common horn. As an orchestral instrument, the H. is of great importance. There are never less than two horns in an instrumental score, and in many great works four horns are absolutely necessary. The date of the invention of the H. is lost in antiquity.

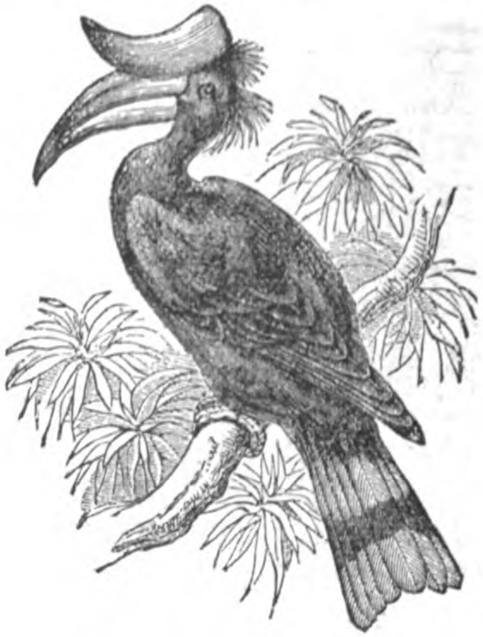


Valve-horn.

HORNBEAM, n. *hŏrn'bēm* [see BEAM—so named from the character of its wood], (*Carpinus*): genus of nat. ord. *Cupuliferæ;* consisting of trees with compact tough, hard wood; bark almost smooth and of a whitish-gray color, deciduous leaves, and monœcious flowers. The male catkins are cylindrical and sessile, their flowers consist merely of a little scale-like bract and 12–24 stamens. The female flowers consist of a germen, crowned with the 4–8-toothed border of the perianth, and with two thread-like stigmas, and are placed in loose slender catkins, always two together, each at the base of a stalked bract, which is three-cleft or three-cornered, and which, when the tree is in fruit, enlarges very much, becomes leafy, and covers the fully ripened nut on one side. The nut has a thick husk, and is small and striated. The COMMON H. (*C. Betŭlus*), very frequent in the woods of many parts of Europe, is a beautiful tree, attaining a height of 60–100 ft., and in appearance like a beech. It has elongato-ovate, acuminate, almost triply serrate leaves. When in fruit, it has very large, deeply 3-partite bracts. It thrives best in a moderately moist and shady situation. Its root descends deep into the ground. The wood is white, very hard, uncommonly strong and tough, therefore suitable for bearing heavy strains. It is much used by joiners, turners, and wheelwrights. It takes a very fine polish, and, when well stained, might readily be mistaken for ebony. In the earth, or where exposed to changes of weather, it is of no great durability. It burns like a candle, and it is one of the best kinds of firewood; it affords excellent charcoal, and the ashes yield much potash. The young stems, by reason of the dense growth of their twigs, are very suitable for forming live-fences and bowers; and as it bears clipping very well, the H. was often employed to form those live-walls formerly the fashion in gardens.—The American H. (the blue or water beech, or iron-wood) is *C. americana*.

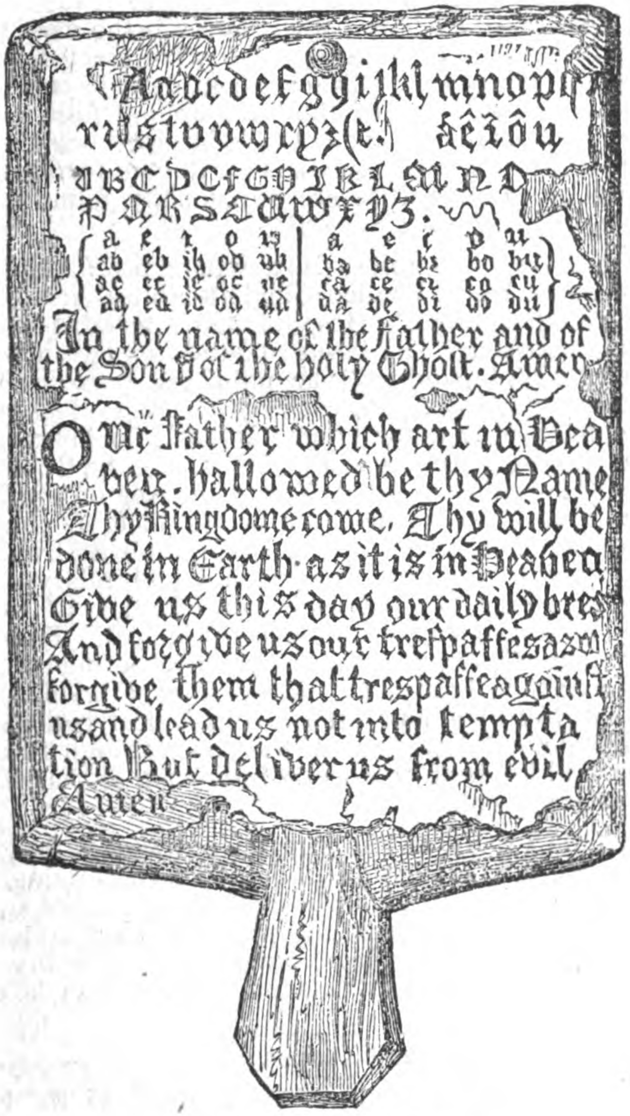
Hornbeam (*Carpinus Betŭlus*).

HORNBILL: genus (*Buceros*), and family (*Bucerotidæ*), of birds, to which Cuvier assigned a place in the syndactylous division of the order *Insessores*, but which some naturalists rank with crows in the tribe *Conirostres*. Their anatomical structure has been found to indicate affinities both with crows and toucans, and the same inference may be drawn from their habits. The species number more than 50; they are natives of Africa and the E. Indies. They are mostly large birds, some nearly as large as a turkey, the smallest rather smaller than a magpie. They are remarkable for enormous size of bill, and for a large bony protuberance with which the bill is generally surmounted. The bill is curved, broad at the base, compressed toward the tip; the bony protuberance on the upper mandible assumes different forms in different species. They are social birds, and have some very remarkable habits; and are so voracious that they may be described as omnivorous.


Hornbill (*Buceros Rhinoceros*).

HORNBOOK: primer or apparatus for learning the elements of reading, used in England before the days of printing, and common till the time of George II. It consisted of a single leaf, containing on one side the alphabet large and small, in black-letter or in Roman, with perhaps a small regiment of monosyllables. Then followed a form of exorcism and the Lord's Prayer, and as a finale, the Roman numerals. The leaf was usually set in a frame of wood, with a slice of transparent horn for protection in front—hence the name *horn*-book. There was a handle to hold it by, and usually this handle had a hole for a string, whereby the apparatus was slung to the girdle of the scholar. Sometimes the leaf was simply pasted against a slice of horn.

At first, the leaf was of vellum, with the characters in writing; latterly, of paper, and printed. The H. was prefaced and otherwise ornamented with figures of the cross, and hence came to be often called Christ Cross Row, or Criss Cross Row. Common as hornbooks at one time were, specimens of them are now exceedingly rare. The annexed representation is copied from one given by Halliwell, as taken from a black-letter H. found some years ago in pulling down an old farmhouse at Middleton, in Derbyshire, England. A portrait of King Charles I. in armor on horseback was on the reverse, affording an approximation to the date. In *Notices of Fugitive Tracts*, printed for the Percy Soc. (1849), Halliwell figures a more perfect specimen, which he assigns to the time of Elizabeth. Allusions to the


Aabcdefgghiklmnopq
rſstuvwxyz&. aeiou
ABCDEFGHIKLMNO
PQRSTUWXYZ.
a e i o u a e i o u
ab eb ib ob ub ba be bi bo bu
ac ec ic oc uc ca ce ci co cu
ad ed id od ud da de di do du
In the name of the Father and of
the Son & of the holy Ghost. Amen
Our Father which art in Hea
ven. hallowed be thy Name
Thy Kingdome come. Thy will be
done in Earth as it is in Heaven
Give us this day our daily bre
And forgive us our treſpaſſes as w
forgive them that treſpaſſe againſt
us and lead us not into tempta
tion But deliver us from evil
Amen

Hornbook—17th century.

H. abound in the older writers; Shenstone, e.g., in *The Schoolmistress*, tells us of the children, how

> 'Their books of stature small they take in hand,
> Which with pellucid horn secured are,
> To save from fingers wet the letters fair.'

HORN'CASTLE: market-town of England, county of Lincoln, in an agreeable district at the foot of the Wolds, 20 m. e. of Lincoln. The parish church is the most interesting public building; portions of it were erected during the reign of Henry VII. There is considerable trade here in grain and wool; and of the three annual fairs, one in Aug. lasts ten days, and is one of the largest horse-fairs in Britain. There are at H. remains of a Roman fortification; coins and other antiquities are occasionally found in the neighborhood. Pop. (1881) 4,814.

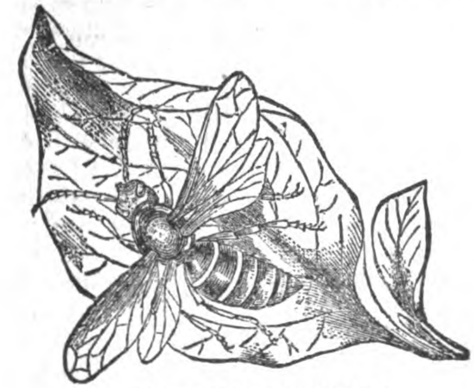
HORNE, *hawrn*, THOMAS HARTWELL, D.D.: 1780, Oct. 20—1862, Jan. 16; b. London: English biblical critic. He was educated at Christ's Hospital, and afterward became clerk to a barrister. His leisure hours were given to the study of the Bible, and 1818 he published *Introduction to the Critical Study and Knowledge of the Holy Scriptures*, a work which procured for him admission into holy orders without the usual preliminaries. Subsequently, St. John's College, Cambridge, granted him the degree of B.D., and two American colleges that of D.D. In 1833, he obtained the rectory of St. Edmund the King and St. Nicholas Acons, London. He was also made a prebendary of St. Paul's Cathedral. H. published a great variety of works, but the one above mentioned is the principal. From the first moment of its appearance, it not only became popular, but attained the dignity of being considered the text-book on the subject in almost all the theological colleges of Great Britain and America. It has gone through 11 or 12 editions, and has been frequently improved, so that it still retains its high reputation.

HORNED FROG, or HORNED TOAD: lizard of the genus *Phrynozoma*, not a batrachian, but a saurian, though resembling a frog or a toad. The half dozen species are N. American. The name has been given also to a S. American batrachian (genus *Ceratophrys*), on whose head spiny protuberances are developed. It is much larger than the common frog.

HORNED POUT: see CATFISH.

HORNELLSVILLE, *hawrn'ělz-vĭl:* town in H. tp., Steuben co., N. Y.; on the Canisteo river, at junction of the Buffalo and Dunkirk divisions of the Erie railroad; 58 m. s. of Rochester, 90 m. s.w. of Buffalo, 332 m. w.n.w. of New York. It contains 8 churches, convent, free acad., business college, several public schools, public library, 2 national banks (cap. $200,000), 1 state bank (cap. $50,000), 1 private bank, opera-house, railroad repair-shops, boot and shoe manufactories, and furniture, machine, and mowing-machine factories. Pop. (1870) 4,552; (1880) 8,195.

HORNET, n. *hŏr'nĕt* (Ger. *horniss*, from the buzzing noise: Dut. *hornsel*, a hornet—from *horselen*, to buzz), (*Vespa crabro*): species of large wasp (q.v.). The thorax is mostly black, the fore-part rufous; the abdomen yellow, with three brown points on each segment. The sting is very painful. The H. is a very voracious insect, seizing and devouring flies, bees, and other insects, or carrying them to its nest to feed its young. The nest is in a hollow tree, in an outhouse, or other sheltered place. The community is not supposed ever to contain more than about 200 individuals, all deriving their origin from a single female, which, having survived the winter in some sheltered hiding-place, lays the foundation of the nest in spring. The nest is a curious structure, of a substance resembling coarse paper made from decayed wood mixed with a salivary secretion and kneaded into a pulp; and, except as to size, similar to that of the common wasp. The community consists of females, males, and neuters or workers, as in the case of bees, but there are numerous females. Most of the males and neuters perish on the approach of winter, some of the females alone surviving.



Hornet (*Vespa crabro*).

HORNIE, n. *hawrn'ĭ:* one of the many popular names for the devil, in allusion to the horns which he is sometimes represented as wearing.

HORNITOS, n. *hor-nē'tos*, or HOR'NOS, n. *-nŏs* [Span. *ovens*]: low oven-shaped hillocks which emit smoke and vapors, and which are numerous on the sides and in the neighborhood of the large volcanoes of S. America.

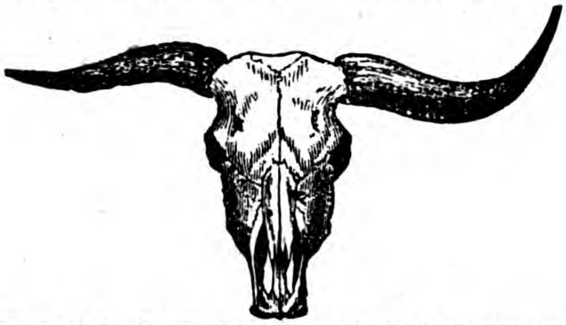
HORNIZE, v. *hŏr-nīz'* [so named after the inventor, Mr. *Horn*]: to pave or causeway a footpath with chips or splinters of such hard rocks as greenstone or granite. HORNIZ'ING, imp.: N. the art of paving footpaths with stone-chips. HORNIZED, pp. *hŏr-nīzd'*.

HORN MANUFACTURES: making of useful and ornamental articles from the horns of various animals; principally those of the ox, buffalo, and two or three species of deer, and of sheep and goats. Horn can be softened and split into thin laminæ, or pressed into molds; and as, when cold, it recovers its peculiar character of flexibility, tough-ness, and transparency, it is particularly adapted for a great variety of purposes. It can also be dyed various colors. Solution of gold in aqua regia, dyes it red; solution of nitrate of silver in nitric acid, black; a paste of red-lead made with a solution of potash, colors it brown; so that, with a proper arrangement and application of these materials, the most admirable imitations of the much more costly tortoise-shell can be produced. The more common vegetable dye-stuffs as logwood, Brazil-wood, barwood, saffron, indigo, etc., also color it, but neither so permanently nor so brightly as the metallic materials. By long-continued soaking, the horns of all the animals above mentioned, except the deer, can be softened, and those of the sheep and goat can be easily split into several layers when they have been soaked and boiled; and these layers can not only be flattened out by putting them between smooth iron plates heated and placed in a press, but if the edges of two or more are brought together between polished copper plates, and these tightly screwed together with a hand-vice, and plunged for some time in boiling water, and thence into cold water, the edges will be found firmly welded together, and the same property enables the horn-worker to use up the smallest cuttings with profit. Another valuable property of horn is, that when heated it can be pressed into a die, and not only takes a beautifully sharp impression, but if left in the die until cold, it retains it. In this way, then, it is employed in making handles for umbrellas, knives, forks, etc., and ornamental boxes, and a variety of other articles. Combs are made of the flattened sheets, and beautiful carvings from the solid parts of the buffalo-horns brought in vast numbers from the E. Indies. Ox-horns, too, are sometimes of fine quality and color, and are fashioned into drinking-cups, and other articles, often highly ornamental. Deer-horns, which, strictly speaking, are bone, have a very limited application; they are employed in some countries for making knife-handles, called buck-horns, in much favor for pocket knives; but on the European continent the horns of the fallow-deer are extensively used in making the deer-horn articles of furniture peculiar to Germany. The deer-horns used in Great Britain are chiefly those of the Axis (*Axis maculata*), of which at least 100,000 are annually imported from the E. Indies. From the same country buffalo-horns are exported, while from S. America and other parts, the exportation of ox and cow-horns is immense.

HORNS: appendages to the frontal bones of many of the extensive family of ruminants, obviously intended as weapons of defense. In the genus *Cervus* (deer), the H. (known also as antlers) are solid, uncovered by epidermis, bone-like in composition, and deciduous. In the genus *Camelopardalis* (the giraffes), we have the single example of solid persistent H. completely invested with a hairy integument. In the other horn-bearing ruminants—as the ox, sheep, goat, and antelope—the H. are hollow, uncovered by epidermis, are composed of a special tissue (see HORNY TISSUES) quite different from bone, and are persistent. In all these cases, the H. are attached to the cranial bones; and in all the hollow H., except those of the antelope, the osseous axis is hollowed into cells communicating with the frontal sinuses, and thus admitting the atmospheric air into the interior. The horn of the rhinoceros is quite distinct in character from the H. in any of the ruminants. It is a tegumentary, not an osseous appendage, and is usually described as if it were a mass of hairs which had coalesced. It consists, however, in reality, of an aggregation of tubes, round which the horny matter is arranged in concentric laminæ, as in the horny excrescences on the inner surface of the leg of the horse. The first and the third variety—viz., the antlers of the *Cervidæ* and the hollow H. of the ox, etc —are the only H. that require special notice.

For the deciduous H. of the *Cervidæ* at different ages, and their process of growth, see DEER. It need be added only that these H. are formed on two well-marked morphological types—one group possessing rounded antlers, such as in the roebuck and the red-deer; the other having the antlers more or less flattened, as in the elk and fallow-deer. A remarkable sympathy exists between the generative organs and the H.; and the development of the latter may be arrested, and their periodical shedding may be prevented by castration. As a general rule, it is only in the male *Cervidæ* that H. are developed. In the reindeer, however, they are common to both male and female.

In the hollow-horned ruminants, the bony protuberances or 'cores' arising from the frontal bones, and supporting the H., instead of branching like antlers, form more or less solid cylindrical shafts, the surface being protected by ordinary Periosteum (q.v.), and by an extension of true skin, which becomes developed into a dense horny sheath. In the accompanying figure, the horny sheath is detached from the right horn, to show the 'core' in the interior.

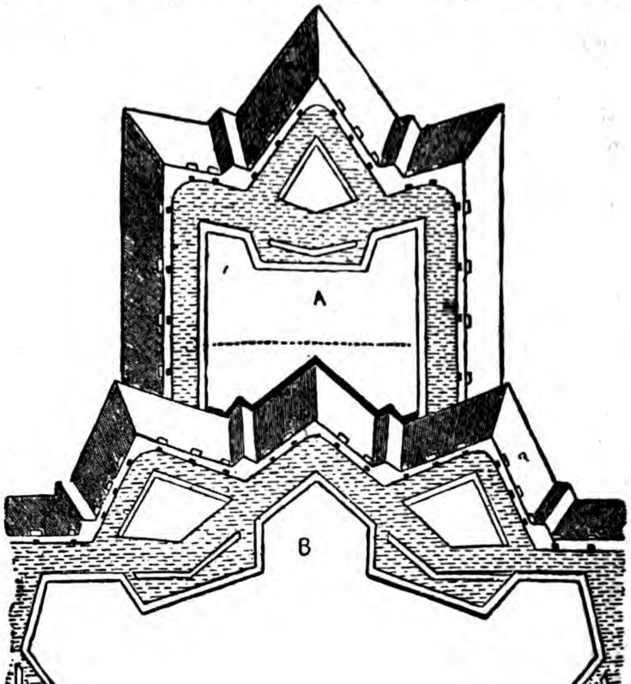


Front View of the Skull of the Ox, with the right Horny Sheath detached from the Core.

The H. of ruminants are almost invariably two in number, but exceptions occur in the case of the extinct Bramatherium and Sivatherium, and among living species, in the Four-horned Goat, the Many-horned Sheep, etc. In the Prong-horn Antelope there seems to be an approach to the cervine type. there being a prong of some length about half way up the horn, which may be regarded as analogous to the brow-antler.

The practice of dehorning cattle, recently introduced, has warm advocates and strong opponents. The former claim that removal of the horns makes vicious animals less dangerous to their keepers, and prevents the stronger from worrying and injuring the weaker members of the herd. Opponents of the system claim that it is of little or no benefit and involves severe suffering. In England, the court of the queen's bench has decided that the removal of horns from mature animals is an unnecessary and illegal infliction of torture. The growth of the horns can easily be prevented by removing the germs when the calf is only a few weeks old. The skin is cut so as to expose the embryo horn, which has not become firmly united with the skull, and which can be readily removed with a sharp knife. The wound is then dressed with tar, and will soon heal. It is also claimed that the frequent use of caustic potash upon and around the embryo horn will permanently check its growth. Neither of these methods will cause severe or long-continued pain or prove injurious to the animal. Dehorning grown cattle is cruel, and the prevention of the growth of the horns of calves is of doubtful utility.

HORN-WORK, in Fortification: work having one front only, thrown out beyond the glacis of a fortress; with a view, 1. To strengthen a weak salient in the general outline; 2. To occupy a plateau in advance of the place, or to protect buildings, the including of which in the original enciente would have extended it to an inconvenient degree;



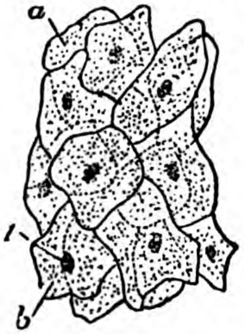
A, Horn-work, covering a Bastion, B.

3. To occupy a tongue of land protected on its sides; 4. To bar a defile; 5. To cover the head of a bridge; 6. To occupy rising ground, the possession of which would render the enemy more than necessarily dangerous. The front of a H.-W. consists of two demi-bastions connected by a curtain, and usually defended in front, as in the fortress itself, by tenaille, ravelin, and covert-way. The flanks, protected by ditches, run straight upon the ravelin, bastion, or curtain of the main defenses, so that the ditch may be swept by the fire of the latter. The flanks should not be too long for easy musketry range.

In most of the earlier works of this nature, the ditch of the H.-W. was united with the ditch of the main works by being cut through the glacis and covert-way, but in modern works the H.-W. is constructed entirely beyond the glacis, as the annexed figure shows. The masonry wall is shown in the figure by a thick black line at the head of the H.-W. and immediately beyond the glacis, but at times it is merely a straight wall thrown across, as in the dotted line.

Occasionally, H.-W. are very useful; but modern engineers generally prefer constructing detached and advanced works. A double H.-W. becomes a *Crown-work* (q.v.).

HORN'Y TIS'SUES: formerly regarded as extremely simple in structure, and as only different forms of a substance to which the term *keratin* (from *kĕras*, a horn) was applied. Recent investigations, however, show that the parts which consist of horny tissue—e.g., the persistent horns of the ruminants, the epidermis, the nails, claws, and hoofs, whalebone, tortoise-shell, etc.—have a somewhat complicated, and, in some respects, variable structure, though they are so far analogous to one another that they proceed from nucleated cells which are not morphologically developed like the cells of most other organs, but which, to a certain extent, dry up and are only agglutinated together by an intercellular substance. In a chemical point of view, they also closely resemble one another, for when compared with other tissues they all contain a large quantity of sulphur, in combination with a substance whose origin from, or affinity with the proteine bodies (q.v.), is sufficiently obvious from their behavior toward certain reagents (the caustic alkalies and the mineral and acetic acids, for example), and their percentage composition.



Horny Tissues:
a, cell of the underlayer;
b, cell of the upperlayer;
1, nucleus of the latter.

The accompanying figure represents a longitudinal section of cow's horn (magnified 410 diameters) taken perpendicularly to the surface, kept for four hours in concentrated potash solution, to which water was then added. If, however, a section of horn is examined in its natural state, it appears to consist of numberless bundles of fine threads lying side by side. After the addition of the potash solution, these bundles are seen to unfold into little plates, which gradually expand into the regular nucleated cells shown in the figure.

The cellular structure of hoofs, whalebone, tortoise-shell, etc., may be exhibited in a similar manner. It is to the histo-chemical investigations of Mulder and Donders that we are mainly indebted for knowledge of the structure of these tissues: they seem to have established that every horny tissue contains at least three different kinds of substances—1. The substance of the cell-membranes, exceedingly difficult of solution in alkalies, and forming the principal part of the tissue; 2. The cell-contents, which dissolve more readily in alkalies; and 3. A connecting, or true intercellular substance.

These tissues have been submitted to ultimate analysis, after having been previously digested in water, alcohol, and ether. The analogy of their composition is shown in the following tabular view:

	Hair.	Horse's Hoof.	Cow's Horn.	Nails.	Epidermis.	Whalebone.	Tortoise-shell.
Carbon	50·65	51·41	51·03	51·09	50·28	51·86	54·89
Hydrogen. ..	6·36	6·96	6·80	6·82	6·76	6·87	6·56
Nitrogen.....	17·14	17·46	16·24	16·90	17·21	15·70	16·77
Oxygen......	20·85	19·94	22·51	22·39	25·01	21·97	19·56
Sulphur......	5·00	4·23	3·42	2·80	0·74	3·60	2·22

These tissues differ slightly in the quantity of inorganic matter which they contain, but the difference does not vary much beyond 1 per cent.

Hair yields from 0·54 to 1·85 per cent. of ash, containing, among other ingredients, peroxide of iron and a little silica. In feathers, the quantity of silica is considerable, and it is doubtless to this constituent that the shaft in a great measure owes its strength and hardness.

HORODENKA, *hō-rō-dĕn'kâ:* town of the Austrian Empire, province of E. Galicia, on an affluent of the Dniester, 106 m. s.e. from Lemberg. Pop. (1879) 10,226.

HOROGRAPHY, n. *hō-rŏg'ră-fĭ* [Gr. *hōră*, an hour; *graphō*, I write]: an account or description of the hours.

HOROLOGE, n. *hŏr'ō-lŏj* [F. *horologe*—from L. *horolŏg'ĭŭm*, a clock or sun-dial—from Gr. *hōră*, an hour; *logos*, a word]: any instrument for measuring time; a watch. HOR'OLOG'IC, a. *-lŏj'ĭk*, or HOR'OLOG'ICAL, a. *-ĭ-kăl*, pertaining to horology or time-keepers; in *bot.*, applied to flowers which open and close at certain hours. HOROLOGY, n. *hō-rŏl'ō-jĭ*, the science which treats of the construction of clocks and watches. HOROL'OGIST, n. *-jĭst*, one versed in.

HOROL'OGY: branch of applied science that relates to measurement of time. Even in the period when time, according to the modern conception of it, as measured by hours, and minutes, and seconds, was unknown, progress was early made in the measurement of larger periods of time, by observations of the heavenly bodies; for though it is now known that the movements of the more conspicuous heavenly bodies do not afford accurate marks for equable measurement of time, those movements were for practical objects, sufficient, or afforded at least the best measure then applicable. Thus, time was early divided into years, according to the motion of the sun among the constellations; into months, according to the motion of the moon relatively to the sun's place in the heavens; and into days, by the alternate light and darkness caused by the rising and setting of the sun. It was long before any accurate measure was found for a division of the day itself. The earliest measure for this purpose that we can trace is the shadow of an upright object, which gave a rough measure of time by the variations in its length and position. This suggested the invention of sun-dials (see DIAL). Another early method for the measurement of short periods of time was by the quantity of water discharged by dropping from one vessel into another: instruments on this principle were called Clepsydræ (see CLEPSYDRA). The running of fine sand from one vessel into another was found to afford a more certain measure: see HOUR-GLASS. King Alfred is said to have observed the lapse of time by noting the gradual shortening of a lighted candle.

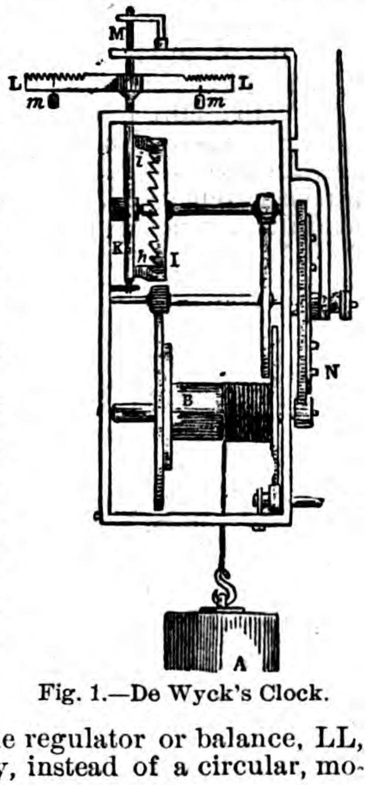


Fig. 1.—De Wyck's Clock.

It is not easy to trace to its source the invention of the modern clock: the earliest of which we have a complete description, perhaps the earliest distinctly superior to the rude machines above mentioned, was the clock of Henry Vic or De Wyck, a German, erected in the tower of the palace of Charles V., King of France, 1379. In this simple clock, as the weight A tends to uncoil the cord and set in motion the cylinder B round its axis, the motion will be successively communicated to the various toothed wheels in the figure, and finally to the crown-wheel or escapement-wheel, I; the teeth of which so act on the two small levers or pallets, *i*, *h*, projecting from, and forming part of the suspended upright spindle or vertical axis, KM, on which is fixed the regulator or balance, LL, that an alternating or vibratory, instead of a circular, motion of the balance itself is the result. The hands of the clock are attached to the wheel N, also set in motion by the cylinder B. Now, unless there were some check upon the motion, it is manifest that the heavy weight A would go rapidly to the ground, causing the wheels to rotate, the balance to vibrate, and the hands to go round with increasing velocity. In order to prevent this rapid unwinding of the clock-work, and adjust it to the more deliberate. measurement of time, the balance is, in De Wyck's clock, loaded with two weights, *m*, *m*; and the further these are removed from the axis or spindle, KM, the more heavily they will resist and counteract the escapement of the levers, and the rapidity of the rotation of the escapement-wheel, till the clock be brought to go neither too quick nor too slow.

The above construction is probably the basis of all the principal time-keeping machines in the 16th c. The great epoch in the history of horology is marked by the application to it of the pendulum (q.v.) as a regulating power. This was effected by Huygens (q.v.) about 1657. This philosopher, in adapting the pendulum to the machinery previously invented, had little more to do than simply to add a new wheel to the movement, so as to enable him to place the crown-wheel and spindle in a horizontal instead of a perpendicular position, that the lower arm of the balance—then of course perpendicular, instead of horizontal, as in De Wyck's clock—might be extended, as it were, downward, and thus, in fact, be converted into a pendulum.

The principal of construction adopted by Huygens, from the peculiar action of the levers and spindle, required a light pendulum and great arcs of oscillation; and though, to secure isochronous vibration in these large arcs, the ingenious device of constraining the motion in a cycloidal curve was resorted to, yet the consequence was, as has been remarked, that 'Huygens's clock governed the pendulum, whereas the pendulum ought to govern the clock.' About ten years afterward, the celebrated Robert Hooke (q.v.) invented an escapement, which enabled a less maintaining power to carry a heavier pendulum. The pendulum, too, making smaller arcs of vibration, was less resisted by the air, therefore performed its motion with greater regularity. This device is called the *crutch* or *anchor escapement*. It was brought by Hooke to the notice of the Royal Soc. 1666; and was practically introduced into the art of clock-making by Clement, a London clockmaker, 1680. It is the form still usual in ordinary clocks. It regulates the motion as follows: The pendulum is fixed at A, and hangs down behind the pallet-wheel (the last of the train of wheel-work), which revolves in the direction of BC, under the action of the weight; B and C are the pallets. When the pendulum swings to the left,

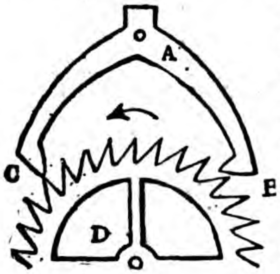


Fig. 2.

AC rises, and a tooth escapes from C, while another falls on the outside of B, and, owing to the form of the pallet B, this latter recoils during the remainder of the swing. The same thing occurs on the pendulum's return; the arm AB rises, a tooth escapes from B, and another falls on the inside of C, and is pushed backward by it during the remainder of the swing. The revolution of D is thus regularly retarded, one tooth being allowed to escape for every two oscillations—i.e., every two seconds—and as the wheel contains 30 teeth, it performs one revolution per minute (the seconds hand is fixed on the extremity of the axle of this wheel). During a portion of each contact between the pallets and teeth, the onward pressure of the wheel gives an additional impetus to the pendulum, so as to counteract the retarding effects of the resistance of the air and friction, which would otherwise bring it to a stand.

The only defect of this escapement is the recoil, and various modifications have been devised to obviate this. The first and most successful was made by George Graham, English watchmaker in the beginning of the 18th c., and his approved form is called the *dead 'scapement* or *dead-beat escapement* (fig. 3). Here the outer surface of B and inner of C are arcs of circles, whose centre is A, and a little consideration will show that there can be no recoil. This escapement is adopted in time-keepers when accuracy is required. Other inventions, as the *detached escapement*, the *pin-wheel escapement* in various forms, and the *gravity escapement* (described below), though very efficient, have not come into general use.

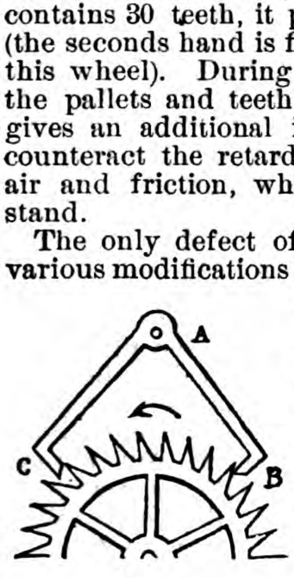


Fig. 3.

In the great clock in the new houses of parliament at Westminster, the pendulum is more than 13 ft. long, to beat 2 seconds, and its bob weighs 6 cwts. The motion is kept up by a *remontoir or gravity escapement.* On each side of the pendulum rod a small metallic hammer is hung upon a peg. 'The swinging of the pendulum first draws out a little bolt, that stopped the turning of a wheel; the wheel then goes round, under the influence of the weight, lifting one of the little hammers as it does so, until it is caught by another bolt. The hammer-head next falls by its own gravity, and strikes the pendulum-rod just as it is in the act of descending, communicating the force of its blow to quicken the movement; the same thing is afterward repeated on the opposite side of the vibration, and then again on the same side; so going on alternately.' The push thus given is evidently unvarying. The wheel has three stops and cogs on it, and goes once round in three beats of the pendulum, or in six seconds. With this contrivance 'it is found that all the teeth of the several wheels may be rough, just as turned out from the casting, and the clock will nevertheless keep better time than it would have done with the most perfectly finished teeth under other arrangements.'

The gradual perfection of the clock required also improvements in the pendulum (see PENDULUM).

The improvements in the escapement and the pendulum above referred to bring the mechanical perfection of the clock, as a time-keeping instrument, to the point which it has attained at the present day. But the art of horology would be incomplete unless there were some standard, independent of individual mechanical contrivances, to which all may be referred, and by which the errors of each—which must exist in the most perfect human contrivances—may be corrected. The movements of the heavenly bodies are still, as of old, the only standard for a general measurement of time, affording as they do marks of unvarying certainty, to be read by all alike; and clocks and other mechanical contrivances are individual and imperfect measures of the intervals, to be trusted only until there is a new opportunity of comparing them with the certain and public signals of the heavens. These signals can be accurately read only by persons furnished with the proper apparatus, and instructed in its use. This is done in observatories, and there are now in various civilized countries sufficient opportunities of setting clocks by a communication more or less direct with observatories. When these are not to be had, the sun-dial may still be used with advantage, as means of approximation to the correct time. The time which a clock ought to mark is *mean time*, for the definition of which see DAY. The *mean time* at any *place* depends on the longitude. Supposing a clock to be set at Greenwich (England) mean time, a clock keeping mean time of any place will be 4 minutes faster for every degree of longitude e. of Greenwich, and 4 miuutes slower for every degree w. Since the introduction of railways, clocks are usually set, within Great Britain, to Greenwich mean time.

The remarkable development of the railroad and telegraph systems of the United States after the close of the civil war, emphasized the anomalies of existing time standards. Travellers, railroad and telegraph authorities, and business communities were inconvenienced by the confusion caused by the differences in local standards, the running of trains by local time on different roads, and the various standards observed on a single route. Scientists individually and in corporate capacities urged the feasibility and advantages of uniformity in the mode of reckoning time. Among these, Prof. Charles F. Dowd sought to provide a remedy as early as 1860. He patiently elaborated a system of longitudinal time applicable to all parts of the country, and first submitted his ideas to a railroad convention in New York 1869, Oct. At that time the differences in local time between the e. coast of Me. and San Francisco was 4 hours, and there were 70 railroad time standards and 30 or more local standards in operation —over 100 in all, and each one differing from the others. His very detailed plans were based on the establishment of four time belts, located 15 degrees apart, with Washington time as the prime meridian. This was a great step forward, though, as might be expected, various objections were raised against parts of the plans. Prof. Dowd persisted in his computations and efforts to enlist the co-operation of the chief railroad authorities, and modified his plans to meet their practical wants. In 1873 committees of the New England, Western, and Southern railway associations agreed to his system modified, so as to constitute the 75th meridian the prime standard, instead of Washington. In 1875; Prof. Cleveland Abbe, of the U. S. Signal Office, Sanford Fleming, of the American Soc. of Civil Engineers, J. Raymond Edmands, of Harvard Univ., Prof. J. K. Rees, of Columbia College, D. H. Bates, of the Western Union Telegraph Company, and other specialists, agreed on the four-time-belt plan, based on the 75th (near Philadelphia), 90th (near St. Louis), 105th (near Denver), and 120th (near Virginia City, Nev.), degrees of longitude, which would give exactly one hour's difference in clock time between each of these four points. Each meridian was intended to set the time for the belt 7½° each side of it. In this form the scheme was indorsed by the leading scientific societies of the country, recommended to the National Railroad Time Convention, and by it referred to its sec., W. F. Allen, for expert consideration. On his favorable report the plan was adopted, and the new time went into operation at noon on Sunday, 1883, Nov. 18. Beyond the four time-belts in the United States, known as the Eastern, Central, Mountain, and Pacific time standards, there is a fifth—the Intercolonial, for the railroads in Nova Scotia, New Brunswick, and the Dominion of Canada as far as Quebec, all being e. of the 75th meridian.

The methods by which time is determined in observatories belong to the details of practical astronomy. For the more ready transmission of correct time to the public, there is at some observatories a ball which is dropped by means of electricity precisely at an hour fixed and publicly known; from this clocks and watches may be set daily. By an ingenious device of recent years, public clocks in a town can be kept at every instant in perfect agreement with the mean-time clock in the observatory. This is effected by an electric connection, and a modification of Bain's electric pendulum, invented by R. L. Jones, of Chester, England, on the suggestion of Mr. Hartnup, astronomer of the Liverpool Observatory: for description, see ELECTRIC CLOCK. The first public application of it was to the town-hall clock in Liverpool, when for the first time was seen the curious spectacle of a great clock with works nearly 100 years old keeping time with astronomical accuracy. In the same way, a clock in the castle of Edinburgh, by whose mechanism a gun is fired precisely at one o'clock every day, is controlled by the mean-time clock in the observatory on the Calton Hill.

There are now in the United States observatories performing this public service, at Harvard Univ. (Cambridge), Yale Univ. (New Haven), Albany, Allegheny, Washington, Cincinnati, and Chicago. The Jones system is used: the standard clock is placed in the same electric current with the clocks to be controlled; and a helix in each clock to be regulated, alternately encircles two magnets attached to the pendulum, which magnets are alternately attracted and repelled by the helix. In some cities, e.g., Boston and New York, the exact instant of noon is indicated by a ball dropping, by means of an electric current, from a flagstaff on a conspicuous building.

It is not known when the alarm, or when the striking-mechanism of the clock was first applied. The alarm was adopted for the use of the priesthood, to arouse them to morning devotions. The first striking-clock probably announced the hour by a single blow, as they still do in churches to avoid noise. During the 17th c. there existed a great taste for striking clocks, and hence a great variety of them. Several of Tompion's clocks not only struck the quarters on eight bells, but also the hour after each quarter; at twelve o'clock 44 blows were struck; and between twelve and one, no less than 113. Many struck the hour twice, like that of St. Clement Danes, in the Strand, London.

The striking part of a clock is rather a peculiar and intricate piece of mechanism. In ordinary clocks the impelling power is a weight similar to that which moves the time-measuring mechanism itself; but the pressure of this weight on the striking machinery is permitted to come into play only at stated periods in the course of the workings of the time-keeping apparatus—viz., at the completion of every hour (or half-hour) when the minute-wheel, which revolves once in an hour, and carries the minute-hand of the clock with it, brings it into action by the temporary release of a catch or detent, permitting the weight wound up on the cylinder of the striking apparatus to run down for a little, in doing which the hammer is forced into action, so as to strike the bell. Whether the strokes shall be one or many, is determined principally by the intricate action of two pieces of mechanism, one called a *snail*, from its form or outline, with 12 steps, and the other a *rack*, with 12 teeth. The time during which the striking-weight is *allowed* to descend varies according to the turning of the 12 steps of the snail on its axis, and the position of the 12 teeth of the rack, at different hours of the day; being sometimes only long enough to permit one blow to be given by the hammer on the bell, and at another time long enough for 12 such blows.

For the consideration of portable time-keepers (watches and chronometers), see WATCH.

HOROMETRY, n. *hō-rŏm'ĕ-trĭ* [Gr. *hōră*, an hour; *metron*, a measure]: the art or practice of measuring time. **HOROMETRICAL**, a. *hŏr'ŏ-mĕt'rĭ-kăl*, pertaining to.

HOROPTER, n. *hŏr-ŏp'tėr* [Gr. *horos*, a boundary; *optēr*, one who sees]: in *optics*, a straight line drawn through the point where the two optic axes meet, and parallel to that which joins the centres of the two eyes or the two pupils.

HOROSCOPE, n. *hŏr'ŏ-skōp* [F. *horoscope*, a horoscope or ascendant at nativity—from L. *horos'cŏpus*—from Gr. *hōră*, an hour; *skopĕō*, I view or consider]: in *astrol.*, a representation of the aspect of the heavens at a given time, as at the hour of birth. HOROSCOPY, n. *hō-rŏs kŏ'pĭ*, divination by the stars; calculation of nativities: see ASTROLOGY.

HORRIBLE, a. *hŏr'rĭ-bl* [F. *horrible*—from L. *horrĭb'ĭlĭs*, dreadful—from *horrērĕ*, to stand on end, to bristle, to shake or shiver]: exciting horror; shocking; hideous; terrible. HOR'RIBLY, ad. *-blĭ*. HOR'RIBLENESS, n. *-bl-nĕs*. HORRID, a. *hŏr'rĭd* [L. *horrĭdus*, rough, bristly]: that does or may excite horror; hideous; gloomy; terrible; offensive. HOR'RIDLY, ad. *-lĭ*. HOR'RIDNESS, n. HORRIF'IC, a. *-rĭf'ĭk* [L. *făcĭō*, I make]: causing horror. HOR'RIFY, v. *-rĭ-fī*, to strike with horror; to render horrible. HOR'RIFYING, imp. HOR'RIFIED, pp. *-fīd*. HOR'RIPILA'TION, n. *-pĭl-ā'-shŭn* [L. *pĭlō*, I peel or pull off the hair]: the peculiar shuddering sensation, resulting chiefly from sudden fright or from horror, familiarly called 'hair standing on end,' or 'curdling of the blood.' HORROR, n. *hŏr'rėr* [L. *horror*, a shaking, a trembling]: an excessive degree of fear with a shuddering; extreme dread or terror mixed with detestation; gloom; dreariness; that which excites horror. HOR'RORS, n. plu. *-rėrz*, the painful sensation of prostration felt by the drunkard deprived of liquor. HORROR-STRICKEN, struck with horror.

HORROCKS, *hor'ŏks*, JEREMIAH: abt. 1619–1641, Jan. 3; b. Toxteth Park, near Liverpool, England: astronomer of remarkable genius, generally known as the first observer of the transit of Venus, an account of which phenomenon he has given in a Latin treatise, entitled *Venus in Sole visa*. He entered Emanuel College, Cambridge, 1632, May 18; and was appointed 1639 to the curacy of Hoole, Lancashire, in which village he made his famous observation (1639, Nov. 24, o.s.), while a mere youth. His death was sudden, on the day before an intended journey, having promised to visit his chief friend, William Crabtree. Dr. Wallis, his contemporary, informs us that Horrocks at the time of his death 'had not completed his 23d year.' The death of this youth had long been recognized as a great loss to science. With little pecuniary resources, and amid many difficulties, he had pursued his purpose of self-education. Hearne, in his memoranda, tells us how H. was called away during his observation of the transit (it was on a Sunday), 'to his devotions and duty at church;' to which interruption the astronomer thus alludes in his treatise: '*Ad majora avocatus, quæ ob hæc parerga negligi non decuit.*' The transit had been overlooked by Kepler, but predicted by H. on calculations that he had made. He returned from his church in time to witness the forecast verified fully (3.15–3.45 P.M.). It was the first transit of Venus ever observed, one predicted by Kepler eight years before having been invisible in Europe. Newton, in the *Principia*, bears honorable testimony to the value of H.'s astronomical work, especially commending his lunar theory as the most ingenious yet brought forward; adding, 'and if I mistake not, the most accurate of all.' H. is frequently mentioned by the scientific men of the 17th c.; the observation of the transit being regarded as not the most important of his astronomical achievements. Hevelius printed the *Venus in Sole visa,* which first appeared in Germany (1662). In 1672 H.'s fragmentary works were published under the auspices of the Royal Soc., being edited by Dr. Wallis, with the title *Jeremiæ Horroccii Opera Posthuma,* etc. The name of Jeremiah Horrocks, long forgotten, except by astronomers, is now, 'after the lapse of more than two centuries,' engraven on marble in Westminster Abbey.

HORRY, *awr-ē',* PETER: date of birth and death unknown; b. probably in S. C.: revolutionary soldier. Early in 1776 he connected himself with the partisan command of Gen. Francis Marion, and subsequently attained the rank of brig.gen. After the war he applied himself to collecting material about the public and military career of his famous commander, and with the Rev. Mason L. Weems published a *Life of Marion* (Philadelphia 1824), which went through many editions.

HOR'SA: see ANGLO-SAXONS.

HORS DE COMBAT, *hōr'dĕ-kŏng'bâ* [F. *hors,* out; *de,* of; *combat,* the fight]: disabled from fighting by wounds or injuries, or prevented from battle by strategy.

HORSE, n. *hŏrs* [Icel. *hross;* Ger. *ross*, a horse: Norw. *hors*, a mare]: a well-known domestic animal; cavalry; a wooden frame with legs; a large stool or tressel: V. to work or furnish with a horse or horses; to ride or sit on anything astride: ADJ. applied to something large and coarse. HORS'ING, imp. HORSED, pp. *hŏrst.* HORSEBACK, n. the state of being on a horse; the posture of riding on a horse. HORSE BREAKER, one who tames and trains young horses for the saddle or draught. HORSE-COURSER, n. *hŏrs-kōr'-sėr* [OF. *couracier*, a broker]: a dealer in horses. HORSE-DEALER, a trader in horses. HORSE-DRENCH, a drastic purge for a horse; the horn by which it is administered. HORSE-FLY, a large fly which stings horses and sucks their blood (see FOREST-FLY). HORSE GUARDS, a cavalry regiment of the British household troops (see HORSE-GUARDS, ROYAL). THE HORSE GUARDS, in Whitehall, London, the headquarters of the British army, and the chief administrative department of military affairs—so called from two mounted sentries at the entrance: the word conventionally signifies the military authorities at the head of army affairs, as distinguished from the civil chief, the sec. of state for war. HORSE-JOCKEY, one who rides a race horse; a dealer in horses. HORSE-KNACKER, one who purchases diseased and worn-out horses, and kills them in order to manufacture their carcasses into certain commercial products. HORSE-LEECH, a variety of leech; a veterinary surgeon. HORSE-LAUGH, a loud, boisterous laugh. HORSE MACKEREL: see TUNNY. HORSEMAN, n. a rider on horseback; one skilled in riding. HORSEMANSHIP, n. the art of riding or managing horses (see below). HORSE-POWER (see below). HORSE-RACE, a running match between horses to test their speed and endurance (see HORSE-RACING). HORSE-SHOE, a curved iron plate nailed on the feet of horses (see HORSE-SHOEING). HORSE-SHOE MAGNET, an artificial magnet in the form of a horse-shoe. HORSE-SOLDIER, a soldier on horse-back. HORSE-TAIL, the tail of a horse; a Turkish standard; a plant of the genus *Equĭsētŭm*, ord. *Equĭsētācĕæ* (see EQUISETUM). TO HORSE-WHIP, to strike or chastise with a riding-whip. TO TAKE HORSE, to mount a horse in order to set out to ride.

HORSE (*Equus*): genus of pachydermatous quadrupeds of the family *Equidæ* (q.v.), or *Solidungula*, generally regarded as including all the species of the family, though sometimes limited (see ASS), to contain only one species, the most important to man of all animals that are used as beasts of burden and of draught. For the principal zoological characters, see EQUIDÆ: ASS. The native country of the H. is uncertain. Some contend for Asia, and some for Africa; some suppose that the H. was domesticated first in Egypt, and quote Scripture in support of their opinion, but to no better purpose than to show that at a very early period the H. was in use as a domesticated and valued animal among the ancient Egyptians; while others adduce arguments not more conclusive to show that it was originally domesticated in the n.e. of Asia; some think it probable that Europe also, and even Britain, had indigenous horses. Whether certain wild races of Central Asia and n. Africa are really indigenous to the regions in which they are found, or the offspring of animals which have escaped from domestication, like those of America; and whether the origin of the domestic H. is to be referred to one original form, or to several forms somewhat different, and belonging to different countries, also are questions uncertain; and the last of them is very similar to that which is so much agitated respecting the dog (q.v.), though the diversities are not so great as in that case.

The lips and teeth of the H. adapt it for cropping the short herbage of dry plains or hills, so that it finds abundance where an ox would be very insufficiently supplied. The feet also are adapted to dry rather than to soft or swampy ground. On soft ground, not only is the foot apt to sink, not being very broad, but the horny hoof is softened, and a diseased state of the feet is the result, as in the case of many of the great dray-horses of London, reared in the alluvial districts of e. England. The H., however, requires a liberal supply of water; and during the dry season, in the hot plains of S. America, great troops of wild horses often rush furiously to the rivers, and as they approach the drinking-place, trample one another under foot, vast numbers of skeletons remaining to bleach in the sun.

Wild horses are found on the plains of Central Asia. Some also inhabit mountains or hilly districts there and in n. Africa. They abound still more in the grassy plains of N. and S. America, though they were introduced into America by Europeans; and certain tribes of Indians, both in N. and in S. America, have become at least as equestrian in their habits as any of the Tartars of the East. Wild horses are found also in the Falkland Islands, into which they were introduced by Europeans, and a peculiar breed has been found wild in the island of Celebes.

The races or varieties of the H. have an evident relation to the climate of the countries in which they occur. Those of cold and stormy regions are comparatively small and rough-haired; those of more favored climates, large and sleek. There are also differences, more evidently to be ascribed to domestication, according to which certain breeds are adapted particularly to certain kinds of work, some excelling in fleetness, some in endurance, some in mere strength for burden or draught. The slender form of the race-horse or hunter contrasts almost as strongly with the ponderous solidity of the dray-horse, as the great size of the latter does with the diminutiveness of the Shetland pony.

Wild horses congregate in troops, sometimes small, but sometimes of many hundreds. The males have fierce contests for the supremacy, and males that have contended unsuccessfully are often driven off to a solitary life. On the appearance of danger, the chief stallion of a small troop seems to direct the movements of all, and even the largest troops seem instinctively to move in a kind of concert, so that when they are assailed, the stronger ani mals oppose the enemy, and protect the younger and weaker. Wolves, even when in packs, attack with success only weakened stragglers, and even the jaguar is repelled.

In fighting, horses either raise themselves on their hind-feet, and bring down the fore feet with great force on the enemy, or wheeling about, kick violently with the hind-feet.

The *Tarpan* of Tartary is one of those races of wild H. sometimes regarded as original, and not descended from domesticated animals. It is of a reddish color, with a black stripe along the back, and black mane and tail. The eye is small and vicious. Tarpans are sometimes caught by the Tartars, but are with great difficulty reduced to subjection. In some of the steppes of central Asia are wild horses of white or dappled-gray color.—The wild horse of S. America is there called the *Mustang*. It exhibits considerable diversity of color, but bay-brown is the most prevalent. It is strong and active, and is often taken with the lasso, and employed in the service of man. A curious method is practiced by some Indian tribes of promptly subduing its wild nature, and rendering it tractable, by blowing strongly with the mouth into its nostrils. By other tribes, it is subdued more rudely. It is thrown on the ground, and ere it can recover, a man gets upon its back, whom, when it rises, it cannot shake off, and who retains his seat until it is quite submissive.—The *Koomrah* of n. Africa is regarded by Col. Hamilton Smith as a distinct species (*E. hippagrus*). It has no forelock, but woolly hair on the forehead, is of a reddish bay color without stripe on the back, or any white about the limbs, has limbs of a somewhat ass-like shape, and the tail covered with short hair for several inches at the root. It is an inhabitant of mountainous regions.

Of domestic varieties and breeds of the H., the number is very great, almost every country or considerable district having one or more of its own, and particular breeds being valued for their fitness for particular purposes. The breeds are also continually varied by crossing, and great improvements have thus been affected. The superior fleetness of the English race-horse and endurance of the hunter are ascribed to the crossing of the old English breed of light-limbed H. with the Arabian; and the English dray-horse, remarkable for its great size and strength, in like manner, owes much of its excellence to the crossing of the largest old English breed of draught-horse with the Flemish. A breed produced by crossing one of the lighter kinds of English draught-horse with the race-horse, is in the highest esteem for carriage-horses. N. America has a breed of light-limbed horses, remarkable for fast trotting. The *Suffolk Punch* has been the origin of many of the most useful kinds of draught-horses employed in Britain for ordinary farm-work. The *Clydesdale H.* is also one of the best breeds of this class, and is an improvement on an older breed. Numerous breeds of smaller size, *ponies*, have long existed in almost all countries. The *Shetland Pony*, which, compared with the dray-horse, is like a pocket edition of a book beside a great folio, is most prized when most diminutive, and sometimes does not much exceed a large dog in stature. A strong man has been seen to lift one with his arm: and to ride on its back while he walked with his feet on each side on the ground. The Shetland pony is, however, very hardy, and remarkably strong.

The Arabian H. has long been the object of untiring care and attention, and to this much of the excellence of the race is certainly to be ascribed. The regard of the Arab for his horse has long been famous. Very similar in some respects to the Arabian is the Barbary H., highly prized in w. Europe before the Arabian was known there, and from the name of which is derived the English word *barb*.

The H. has been used from most remote ages both for riding and for drawing carriages; but rather for pomp or pleasure, the chase, and war, than for agricultural or other labors, for which oxen and other animals were for a long time more generally employed. The H. is an animal of no little intelligence, docility, and affectionateness; qualities of which the display would certainly be more general and perfect, if it were not for the cruel treatment so commonly practiced in 'breaking' and otherwise. The H. has a strong memory of places, and finds again readily a road which it has once travelled before. Its caution in advancing on swampy ground has often excited admiration. It seems often to enter with a kind of enthusiasm into the work in which it is engaged: the war-horse evidently delights in the martial music and military movements to which he has been accustomed; the racer and the hunter seem to know the object of their exertions, and to be as keenly bent upon it as their riders; and the draught-horse often exhibits much acquired expertness in situations of considerable difficulty. Instances are on record of the remarkable display of intelligence also in such things as the opening of doors, corn-chests, etc.; and two instances are known of horses which have learned to turn the tap of a water-barrel in order to obtain water, one of which also ended by shutting it again. A H. has been seen to procure a supply of apples in an orchard by throwing himself forcibly against the trees and shaking them.

The flesh of the H. is used as food in some countries. Its use has recently found advocates in France and some other parts of Europe: see HIPPOPHAGY. It is sold in London as food for dogs and cats. Mares' milk is much used by some of the tribes whose chief wealth consists in their horses: and the Kalmucks subject it to fermentation, and distil from it a kind of spirit. The hide of horses is made into leather, is used for covering large office and board-room tables, etc. The long hair of the mane and tail is used for making haircloth, stuffing mattresses, etc.

For hybrids between the H. and the ass, see HINNY: MULE. Hybrids have been produced also between the H. and the zebra, and between the H. and the quagga, exhibiting, in some degree, the stripes so characteristic of these species; but they have been turned to no use.

Fossil Horse.—The remains of the H. have been long noticed associated with the mammoth, rhinoceros, and other extinct quadrupeds, in the drift formations and ossiferous caverns in the new world, as well as in the old. Their occurrence in America is more remarkable, from that continent presenting no specimens of the H. when it was discovered by Columbus. Cuvier was unable, in the fragments that he examined, to see any difference from the similar portions of the existing species. Meyer and Kaup have pointed out distinctive characters, and Owen has shown that the remains observed in Britain belong probably to two different species. The largest (*Equus fossilis*) was about the height of a middle-sized domestic H. and differed from this animal in possessing a proportionally larger head and jaws, resembling in this respect the wild horses of Asia described by Pallas, and in having the molar teeth, while equal in length, yet decidedly smaller. The second species (*Equus plicidens*) was about the size of a large ass, with differences of teeth. For the palæontological record of the H. and the development of the hoof, see MAMMALIA: FOOT: see also HORSE, FOSSIL.

Horses, of whatever breed or description, should be of good size, shape, and style; for superior animals are fed and kept at the same cost as inferior sorts, are always able to perform their work easily and satisfactorily, and are at any time saleable at remunerative prices. To produce such animals, requires careful selection of sound, active, symmetrical, well-descended parents. The mare carries her colt 11 months, but occasionally exceeds her time by one or two weeks. Farmers prefer their mares to foal in May, from which time the age is generally calculated, but on the turf, ages date from January, and hence the earlier the racing foals are dropped the better. Parturition is usually performed easily and without any assistance, the foal soon rising to his feet, and sucking. Good grass, with a feed of oats daily, will insure abundant supply of milk. Weaning may take place in five or six months; and the foal, when taken from its mother, must be supplied with a few oats and bran, some good hay, and comfortable shelter at night. At a year old, colts are generally castrated; and are gently broken in and lightly worked when about three years old; but, under good treatment, they continue to grow, and ought not to be put to severe work until they are five years old.

Oats and hay are the staple articles of food for hard-working horses. The oats should be sound, sweet, and heavy; and for hacks and hunters, are seldom sufficiently dry until they are a year old. With good hay, 10 pounds of oats is a fair allowance. To insure thorough mastication and digestion, oats should be given either slightly bruised, or with some chaff. For coaching or farm work a few beans or pease should be given; half a bushel, with a bushel of oats and hay, is a usual weekly allowance for well-kept farm-horses. Clover and rye-grass hay (q.v.), is more palatable and nutritive than meadow-hay. Riding-horses, eating a fair allowance of oats, will consume daily 14 pounds of hay; but the heavier class of horses require more. Farmers use oat, pea, and bean straw for fodder during the winter months, and in most well-managed establishments, a considerable portion of the fodder is now given cut, which enables the hard-worked horse to fill himself more rapidly, and thus gives him more leisure for rest and repose. Cart-horses usually have an evening allowance of sliced Swedish turnips or of carrots; a daily pound of linseed-cake is now frequently added, to keep the coat glossy; while a weekly bran-mash is advisable, and should contain during winter an ounce of pounded nitre. Horses should be liberally supplied with water at least three times daily, nor is it ever necessary to restrict the supplies, except for a few hours before severe fast work, and when the animal is much overheated and fatigued. In some well constructed boxes and stables it is so arranged that water is constantly before the animal in a shallow vessel capable of holding about a quart, and which as it is removed, is slowly replenished, and thus cannot be drunk either with undue rapidity or in injurious quantity. During summer, horses generally have such green food as grass, clover, or vetches; but if their work is severe or long continued, oats and hay ought still to form the principal articles of diet. In summer, farm-horses are often turned out to graze after their day's work is over; but it is generally more economical to bring their green food to the stable, or, better still, to commodious yards. It is seldom advisable to follow the old-fashioned plan of turning hacks or hunters out to graze, as they are apt to get kicked or otherwise injured, and besides to lose their condition. If not required during the summer months, they are better and safer in a large yard or a commodious box, where they can have proper feeding and daily exercise. They will thus, at little extra expense, be kept in good condition, and fit for work, their legs free from blemishes, and their constitutions uninjured by violent diversities of feeding and management. The small stomach and natural habits of the horse indicate the necessity of his being fed at frequent moderate intervals of five or six hours. In most localities, farm-horses are brought out at 7 A.M., returning to the stable at 11.30 or 12, being fed and rested for an hour and a half or two hours, and then returning to work for four or five hours. In some places the straggling position of the fields, and their inconvenient distance from the stables, induce many farmers to keep their horses in the yoke from 7 A.M. till 2 or 3 P.M., when they finish for the day. This practice is not commendable, unless the work is very light, and the horses have a feed, a few mouthfuls of water, and 10 or 15 minutes' rest about midday.

To insure health, horses must be kept in commodious, well-lighted, airy, properly-ventilated stables, which ought to be erected only in dry situations, should be thoroughly underdrained, and well paved, if possible without a loft overhead, whitewashed annually, and always kept scrupulously clean and free from smell. This may be effected by prompt removal of soiled or wet litter, and by strewing the floors daily with a little gypsum, or M'Dougal's disinfectant powder. Where there is room, loose boxes are preferable to stalls, especially for the lighter sort of horses, that spend much of their time indoors. With proper feeding, exercise, and grooming, with plenty of fresh air, and good stable management, horses are scarcely ever out of health, and require neither balls, cordials, nor any such messes. Without professional advice, no groom should, under any pretense, be permitted to indulge his predilection for physicking or doctoring healthy horses. See HORSE-RACING: HORSE-SHOEING: HORSE, FOSSIL.

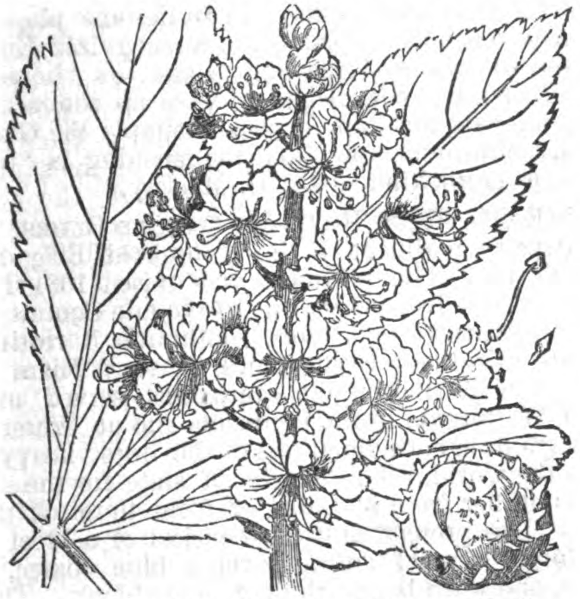
HORSE: miner's term for any intruded material which is the apparent cause of a sudden interruption in the continuity of a mineral that is being quarried. With vein-miners, a detached mass of rock or spar which fills the vein receives this name, while colliers apply the term to the shale which occupies a natural but sudden thinning out of the coal-bed, as well as to such interruptions as seem to have been the channels of small streams, and which were subsequently filled up by the clay that formed the roof of the coal.

HORSE, FOSSIL: early remains of the genus *Equus* by which it is considered that the development of the modern horse has been traced. They have been found in the eocene, pliocene, and miocene periods of Europe and America; but the most interesting as well as numerous fossils—those which exhibit the changes from the four-toed to the present single-toe foot—have been discovered in the quaternary and tertiary strata of N. America, the former stratum disclosing 12 species and the latter more than 30. All these date from the discovery of America, for science has not been able to locate any species of the horse or ass in either N. or S. America in an earlier period. The earliest known animal of the horse family—the *eohippus* of Prof. Othniel Charles Marsh—was found in the lowest part of the eocene basin of Green river, and had three toes on the hind foot and four perfect ones on the fore foot, with an imperfect fifth development on the fore foot. The two bones of the leg now united were then separate, and the animal was about the size of a common fox. In tracing what is considered to have been the evolution, after Prof. Marsh had discovered the root of the investigation, we pass to Marsh's *orohippus* of the middle eocene, where a specimen of similar size loses the imperfect fifth development (rudimentary thumb) on the fore foot, and shows four toes and separate leg bones. In the lower miocene is the *mesohippus*, in which the fourth toe is useless and similar to the rudimentary thumb of the *eohippus;* and also the *miohippus*, about the size of a sheep, in which the leg bones have united, though showing distinct formation, with an almost entire absence of the rudimentary growth, and an expansion of the middle part of the hoof. The upper miocene and lower pliocene give the *protohippus*, an animal larger and more like the present horse than the *miohippus*. In this the fourth toe has wholly disappeared, the two side ones are smaller, shorter, and of little use, and the middle of the hoof exhibits further broadening.

The pliocene also developed the *pliohippus*, with a single full toe and small remains of the two outer ones; and the quaternary yielded the modern horse, with full, rounded, and single-toed hoof. Prof. Marsh conjectures that an earlier specimen than the first here described, probably in the lowest eocene, had four toes on the hind foot and five on the fore foot; and that a still older ancestor, as far back as the cretaceous, had on each foot the five full toes of common mammal life. Beside the pedal feature of this development, large interest is found also in the progression because it shows an increase in the size of the animal, elongation of the head and neck, change in the number (44–40) and character of the teeth, modification of the skull, and union or concentration of the leg-bones which gives the quaternary and modern *equus* far greater speed than the *eohippus* had. Many arguments have been urged against the theory of gradual evolution, in spite of the conclusions of Profs. Huxley and Le Conte and the profound researches of Prof. Marsh, to whom Charles Darwin wrote: 'Your work on . . . the many fossil animals of North America, has afforded the best support to the theory of evolution that has appeared within the last twenty years.' Some opponents, while admitting the possibility of structural similarity in the different genera as formerly classified, deny that evidence exists proving one genus to have been the progenitor of another, or that the various species came from a common origin. Others assert that structural characteristics, if traced from one genus through the others, will at least warrant the conclusion that one genus could not have produced another, and that no one was produced from another by any law of 'natural selection.' Still Prof. Marsh believes the line of descent to have been direct, and that the remains now known supply every important intermediate form. On the gradual disappearance of the toes he gives the conjecture that it 'may have been due to elevation of the region inhabited, which gradually led the animals to live on higher ground instead of the soft low lands where a many-toed foot would be most useful.'

HORSE-CHEST'NUT (*Æsculus*): genus of trees of nat. ord. *Sapindaceæ*, having large opposite digitate leaves, flowers with five spreading unequal petals, and a leathery 3-valved capsule covered with soft spines. The seeds, not more than three in each fruit, are large, and somewhat resemble chestnuts; but the habit of the trees, their leaves, and their flowers, are very unlike those of chestnuts, with which they have no botanical affinity. The genus is indigenous in N. America, and in mountainous parts of Mexico, New Granada, Persia, and n. India, and the Malayan peninsula.—The COMMON H. (*Æ. hippocastanum*) is a much esteemed ornamental tree, frequently planted in all parts of Europe of which the climate is suitable, on account of its rich foliage, and its erect racemes of beautiful reddish white flowers produced at the extremities of the branches, and contrasting admirably with the dark green of the leaves. At St. Petersburg, the H.

is a greenhouse tree. It is supposed to be a native of Persia or some part of the East; but this is uncertain. It was introduced into w. Europe, from Constantinople, in the end of the 16th c. It attains a great size, sometimes rising to the height of 100 ft., and extending its branches very widely, while they often droop almost to the ground. The leaves have long stalks, and seven obovate-wedge-shaped leaflets. The wood is soft, not very strong, nor very durable in the open air; but is used for many ordinary purposes, and by carvers, turners, etc. The bark is bitter and astringent, containing a bitter principle called *Æsculine;* it has been used in tanning and dyeing; that taken from branches not very old has been extensively used on the continent of Europe as a substitute for Peruvian bark. The rind of the seeds contains a coloring matter, which has been used in dyeing: the husks also have been used in dyeing. The seeds are unpleasantly bitter, and contain so much of the saponaceous substance prevalent in this natural order, that when reduced to powder they may be used for washing. They contain, however, a large quantity of starch, which, when extracted and freed from bitterness by means of an alkaline solution, is pleasant and nutritious. It is prepared on a large scale and at a cheap rate in France. Horse-chestnuts have long been employed in various countries as food for oxen, sheep, swine, and horses, all of which are fond of them, and grow fat on them. In Britain and America they are still generally allowed to rot beneath the trees. It is said that when the H. was introduced into Britain, it did not perfectly ripen its seed, which it now does even in the n. parts of the island. —The other species of *Æsculus* are natives of N. America. The foliage is very similar to that of the common horse-



Horse-Chestnut, Leaves, Flowers, and Fruit
(*Æsculus hippocastanum*).

chestnut. Both the leaves and fruit, however, of the **Buckeye** or **American H.** (*Æ. Ohiotensis*) are very poisonous.—N. America possesses also a number of species of a nearly allied genus, *Pavia*, with very similar foliage, smaller flowers, and smooth fruit. The seeds of *P. macrostachya* or *P. edulis*, the **Edible Buckeye**, are eaten, either boiled or roasted. The species is a shrub with long and beautiful racemes of fragrant white flowers, which have long projecting stamens. It is a native of the southern states, and seldom ripens its fruit in England. *P. Indica* is a lofty tree, growing at elevations of 8,000–10,000 ft. in the Himalaya, and producing seeds very similar to those of the H., which, though bitter, are eaten in times of scarcity.

HORSE-COPER, **-cooper**, or **-couper**: see under Cope. **Horse-play**, rough and frolicsome play attended with boisterous noise—*horse* being a recognized Eng. prefix to denote something large and coarse, as 'horse-radish.' *Note.*—**Horse-play** is alleged to have no connection with 'horse,' but that the first element is simply the Gael. *orais*, a rough, tumultuous noise, and the meaning is 'play of a rough, boisterous kind.'—Dr. C. Mackay.

HORSE-GUARDS, **Royal**, or **Oxford-Blues**: the third heavy cavalry regiment of the Household Brigade in the British army. The regiment was raised 1661 from the remnants of the disbanded army of the late Commonwealth. It has ever proved a loyal corps, although it readily transferred its allegiance from James II. to William III. It took part in Marlborough's campaigns; served under the Duke of Wellington in the Peninsula and at Waterloo, and has always been considered one of the finest heavy cavalry corps in the world. The guards of state for the sovereign are taken either from its ranks or from those of the Life-Guards. The present uniform consists of a steel helmet, with plume, a steel cuirass over a blue coatee, leather breeches, and knee-boots; the horses are black. The establishment of the regiment consists of about 30 commissioned officers, and 400 non-commissioned officers and rank and file.

HORSEMANSHIP: art of managing the horse and riding on his back. Through all history it has ranked high among useful and graceful accomplishments. According to Cæsar and Livy, the Numidians and Mauritanians rode their horses without either bit or saddle, and guided them solely by using a small switch, which was applied to either side of the neck, according as they wished to turn. The Persians trained their horses to kneel to receive their riders, and were the first to introduce saddles. Saddles of a similar shape to those now in use were not known till the 14th c., and side-saddles were introduced about 1388. Stirrups were used in the 5th c., but were not common even in the 12th.

The two essentials for riding are a firm seat and a light hand, as without a combination of the two no one can become a good horseman. In every description of riding, the light delicate 'hand,' just feeling the mouth of the horse, and playing the bit in accordance with his movement, will insure success; and it is to this delicacy of wrist that we must attribute the ease and skill with which ladies often ride the most high-spirited animals, which in rougher hands, would be unmanageable.

The first lesson in horsemanship is to learn to mount safely and easily; and the ordinary, and on the whole least objectionable way, is as follows: Stand at the shoulder of the horse, looking toward toward his tail, and taking the reins in the right hand, divide them by the middle-finger of the left till you feel the horse's mouth; then take hold with the left hand of a lock of the mane, lift the left foot into the stirrup, and using the mane as a slight hold, spring into the air, taking hold of the back of the saddle to assist in getting the right leg easily over the horse, steadying the fall of the body by the right hand on the pommel, and then arranging the stirrups. In dismounting, exactly the reverse of this process is followed, or both feet may be disengaged from the stirrups at once, and the rider may vault from the saddle to the ground with greater rapidity, and less risk of falling if the horse chance to move on.

There are four different styles of riding practiced among modern civilized nations—viz., the military, road, hunting, and racing styles. The military style differs in many particulars from the others, as, owing to the long stirrups used, the soldier is obliged to sit well down in his saddle, with his body erect, the seat being preserved more by balance than by a tight hold by the leg or thigh.

In the seat for road-riding, the stirrups are arranged at such a length that when the feet are hanging loose, they shall just touch the ankle-bone, and the rider usually inserts the feet only as far as the 'ball' of the foot. In riding, have the horse well in hand, to assist in supporting him, in case of stumbling; the seat firm, to be secure in case of shying; and a knowledge of handling the bridle, to insure a quick and ready response. In hunting, a much firmer seat is necessary; the stirrup-leathers are about two holes shorter, the feet pressed 'home' in the stirrups, which otherwise would be apt to be lost in jumping; the leg from thigh to the knee well forward, and nearly at right angles to the upper part of the body as inclined forward; the legs perpendicular, the heel well down, and the toe pointing nearly straightforward. This 'seat' the hunter has in common with all equestrian nations, as the Arabs, Tartars, Persians, Egyptians, Cossacks, Magyars, and Circassians, the last-mentioned nation carrying it to such an extreme that the leg assumes the form of the letter V, with the knee for the apex. In riding at a fence, 'collect' the horse into the pace at which he goes with most ease to himself; keep him straight at the fence till he rises; 'ease' his mouth by leaning forward; take especial care not to confine it when he is making his effort, or you will pull him into the fence as he descends; lean well back in the saddle, and gently take hold of his mouth to support him on landing. Do not gallop with a loose rein (excepting down-hill, when the horse requires his head free), for the horse will go with a straggling pace, which is very undesirable. For racing, the essentials are a good and powerful seat, good 'hands,' a great knowledge of pace, and quickness to take advantage of any chances of success. The jockey's seat is peculiar, as his object is to give as much ease as possible to his horse. He rides very much forward, frequently standing in the stirrups, and regulating his pull at his horse according to his orders.

As the strongest part of a horse, and also the centre of action, is at a point just behind his shoulder-blades, the nearer one can ride to this the better, and riding rather forward in the saddle is a relief to the horse, while leaning back, as it bears upon his loins—his weakest part—is a cause of fatigue. The grip in riding should be obtained by the knee, the thighs and the calves slightly. The thigh is the most essential part of a good and strong seat. Few riders whose thighs are short and round, have a good seat; while, on the other hand, jockeys and tall thin men, whose thighs are long, and more or less hollowed on the underside, are generally very firm.

No one can pretend to horsemanship without a knowledge of the proper action for emergencies. If a horse runs away, do not exhaust yourself by vain pulling, but guide him out of danger, and let him run till he is tired. A Bucephalus noseband is a great security against bolting. If a horse rears, loosen the reins, and lean forward; in hunting, the 'art of falling' consists in getting clear of your horse. In case of a horse kicking, keep his head up as much as possible, and sit firm in the saddle.

HORSENS, *hŏr'sĕns:* very old town and seaport on the e. coast of Denmark; one of the prettiest and most thriving in the country; at the head of the fiord of H., 25 m. s.w. of Aarhuus. It contains two churches, has four bridges, and carries on manufactures of tobacco, and considerable general trade. Pop. (1880) 12,654.

HORSE'-POWER: term in mechanics used in expressing the force of a motive power. It is based on the assumption that horses in general perform a certain constant amount of work in a specified time; an assumption evidently erroneous. The fundamental unit of work is the Foot-pound (q.v.); but in measuring the work of a horse by this unit, the estimates of the most celebrated engineers differ widely from each other: Boulton and Watt, basing their calculations on the work of London dray-horses (working eight hours a day), estimated it at 33,000 foot-pounds per minute. D'Aubuisson, taking the work done by horses in whims at Freiberg, estimated the work at 16,440 foot-pounds, working eight hours a day; under similar circumstances, Desaguliers's estimate was 44,000; Smeaton's, 22,000; and Tredgold's 27,500 foot-pounds; 17,400 is thought to be near the truth. It matters little, however, what number is assumed, provided the same be always used; and accordingly the original estimate of Watt is still counted a horse-power. In calculating the power of a steam-engine in terms of this unit, the general rule is to 'multiply together the pressure in pounds on a sq. inch of the piston, the area of the piston in inches, the length of the stroke in feet, and the number of strokes per minute, the result divided by 33,000, will give the horse-power; but it is necessary to deduct about $\frac{1}{10}$ of the whole as an allowance for friction.—See FORCE.

HORSE'RACING: favorite sport, dating from the times of the early Greeks and Romans. In England, Charles I., Cromwell, and Charles II. were more or less patrons of the turf; and the last-named monarch was a regular frequenter of Newmarket, which, partly from this reason, became the metropolis of racing. William III. and Queen Anne also were patrons of horse-racing. Flying Childers, bred 1715 by the Duke of Devonshire, was long considered to have been the fleetest horse ever known; he carried nine stone at Newmarket, and ran 3½ m. in 6 minutes 40 seconds; he was never beaten, and produced 497 winners, besides realizing £200,000 in stakes. The celebrated horse Eclipse, the fleetest from the time of Childers, was bred 1764 by the Duke of Cumberland. Commencing at five years old, this horse won eleven plates, was never beaten, and became the sire of innumerable winners. The modern race-horse is considerably taller and of earlier maturity than the original type, partly from judicious crossing, also from early high-feeding and training; yet there has been a loss of stoutness of constitution, though, for speed, no pure bred Arab has a chance with a modern thorough-bred. The horses are entered as yearlings (a race-horse's age dates from Jan. 1 in the year in which he is foaled); but of 240 entered in this way, rarely more than 25 come to the post two years afterward, the majority being found practically useless for racing purposes, and the forfeits from these horses thus 'scratched' form by far the greater portion of the splendid prizes of the turf. (It has been calculated that there are 1,500 thoroughbred brood-mares in England; that these produce annually about 1,100 foals.) The value of a thoroughbred yearling depends entirely upon 'the fashion' of his blood: as much as 3,000 guineas have been given, and 1,000 and 1,500 are by no means extravagant rates for promising colts. The training of the young racer commences in his second year, when he is placed under a trainer, in an establishment such as those at Newmarket, Middleham, Richmond, Malton, Ilsley, Epsom, etc., where the downs offer a wide expanse of open country for exercise. The trainer's charge is two guineas a week; and for this, each horse is personally attended to and ridden by a lad specially attached to him. A thorough preparation for a great race is a long and troublesome operation, consisting of several stages, during which the colt is gradually brought from a naturally loose condition to the greatest perfection possible: first, by steady and continuous walking exercise, then proceeding by gradual stages to gentle gallopping and sweating, and finishing by testing the capacity of the colt against a competitor at a distance equal to the forthcoming race. It has been found that, practically, the speed of almost all horses can be equalized by addition or substraction of weight to be carried when running; and so nicely is this adjusted, that the Handicaps (q.v.), arranged on this principle, provide some of the best races in the year. The Chester Cup, Doncaster Cup, Ascot Cup, Goodwin Cup, Liverpool Cup, Cezarewitch and Cambridgeshire stakes, all are run on these terms. For the great prizes of the turf, however, the 1,000 and 2,000 guineas, the Derby (about £6,000), Oaks (about £4,000), and St. Leger (about £5,000), for three-year-olds, the horses run on an equality of age and weight.

Enormously large as are the stakes run for—more than £200,000 annually—this is as nothing to the money which annually changes hands in betting. Betting-men may be divided into two classes—those who back a single horse from judgment, or private information; and those who, without any knowledge, but from mere calculation, estimate the odds, and take the 'field' against 'any favorite.' The latter class are the professional betting-men ('the ring'), who devote themselves to the pursuit; the former is composed of the owners of horses and their friends, who trust to their knowledge and tact. Colossal fortunes have been made by the 'ring' in this way, and there are men perpetually attending the country races, and ready to lay against any horse and 'back' the 'field.' As no debts incurred by betting are recoverable by law, they become debts of honor; and any 'defaulter' is amenable only to the regulations of the turf, which have been devised to insure, as far as possible honest dealings. The Jockey Club is the great tribunal of sport in England, and its regulations are adhered to all over the country: it is composed of 64 noblemen and gentlemen, who take an interest in the turf. Newmarket Heath, the great centre of racing, is in its possession, and by virtue of the position and authority of its members, it is enabled to exercise a great check upon dishonesty and fraud. The seven annual race-meetings at Newmarket are as follows: the Craven, first spring, second spring, July, first October, second October, and the 'Houghton.' The principal races are for the 1,000 guineas, 2,000 guineas, Cezarewitch, and Cambridgeshire. The Epsom meeting is the most popular, from its nearness to London, and from the interest attaching to the races for the Derby and Oaks. After Epsom, the Doncaster St. Leger, for three-year-olds, claims the position of greatest interest; it is run for by the competitors in the previous Derby and Oaks, and is generally considered a test of the correctness of their results. Ascot is reckoned the most fashionable meeting in the year; it is held on Ascot Heath, in Berks, and here the best horses in England compete, at a more mature age than at other races. In the race for the Ascot cup 1854, West Australian ran the 2½ m. in 4 minutes 27 seconds, the fastest race on record. Goodwood meeting, in the Duke of Richmond's park, in Sussex, also is popular. There are more than 150 race-meetings annually in the United Kingdom; more than 1,600 horses run at these, and 160 jockeys are in constant employment. A good jockey is considered so valuable, that he is always retained by one or more masters, for a considerable sum, and these gentlemen have a call upon his services in a certain rotation. The regular pay of a jockey is £5 for a winning and £3 for a loosing 'mount'; but there are so many gratuities, that this gives no indication of the income of a jockey, which is often very large: £1,000 has frequently been given by a grateful owner. Racing has become popular in France, Russia, Austria, Prussia, Sardinia, and in the British colonies of India, Australia, the Cape, and Canada, and in the United States.

In addition to the flat-racing in England, there are a great number of steeple-chases, where horses contend over natural and artificial fences, ditches, etc. The sport is dangerous, on account of the immense speed arising from competition, so that horses get too distressed to jump, and broken backs and ribs are the consequence.

In the United States *trotting* is the prime favorite and oldest form of horse-racing; *steeple-chasing* and *hurdle-racing* have become popular since 1865; *placing-races* are growing in favor; and *double-team* contests, usually against time, with trotters, pacers, or one of each, harnessed to a four-wheeled buggy or road wagon, are privately indulged in by a few of the wealthiest horse fanciers of the country. A great impetus to the sport was given by the achievements of several American-bred horses on the English turf, 1865–82. The wonderful performances of Lorillard's *Iroquois* in winning the Derby and St. Leger, 1881, and Keene's *Foxhall* in capturing the Cesarewitch and Cambridgeshire stakes, opened the eyes of the sporting world to the great possibilities of the American-bred race-horse; and the products of our numerous breeding stables have been watched with keen interest. The history of the American turf is replete with surprising records in every form of contest; and with few exceptions every year may be said to show an increase in the form, speed, and lasting qualities of the American racer, due to most painstaking breeding. Some of the recent best performances follow: Running, dashes: 1 m.: *Stuyvesant*, Sheepshead, 1887, Sep. 7: 1.40; 2 m.: *Wildmoor*, Kansas City, 1886, Sep. 29: 3.28; 3 m.: *Drake Carter*, Sheepshead, 1884, Sep. 16: 5.24; 4 m.: *Ten Broeck*, Louisville, 1876, Sep. 27: 7.15¾; heats, best 2 in 3: ¼ m.: *Sleepy Dick*, Kiowa, 1888, Oct. 19: 0.21½, 0.22¼; ½ m.: *Bogus*, Helena, 1888, Aug. 22: 0.48, 0.48; 1 m.: *Bounce*, Sheepshead, 1881, Sep. 7: 1.42, 1.41½; heats, best 3 in 5: ½ m.: *Haddington*, Petaluma, 1883, Aug. 28: 0.49½, 0.50½, 0.49¾; 1.1$\frac{1}{16}$ m.: *Dave Douglas*, Sacramento, 1887, Sep. 23: 1.51½, 1.51½, 1.51½, 1.54, 1.50½. Hurdle: 1 m.: *Swannanoe*, Brighton Beach, 1881, July 16: 1.50; 1$\frac{3}{16}$ m.: *Jim Murphy*, Saratoga, 1888, Aug. 21: 2.12; 2¼ m.: *Buckra*, Sheepshead, 1887, June 21: 4.26; 1 m. heats: *Will Davis*, Chicago, 1886, July 3: 1.49½, 1.51. Trotting: harness, 1 m. by mare: *Maud S.*, Cleveland, 1885, July 30: 2.08¾; 1 m. by gelding: *Jay-Eye-See*, Narragansett, 1884, Aug. 1: 2.10; 1 m. by stallion: *Maxey Cobb*, Narragansett, 1884, Sep. 30: 2.13¼; 1 m. best in first season: *Guy*, Cleveland, 1888, Oct. 29:

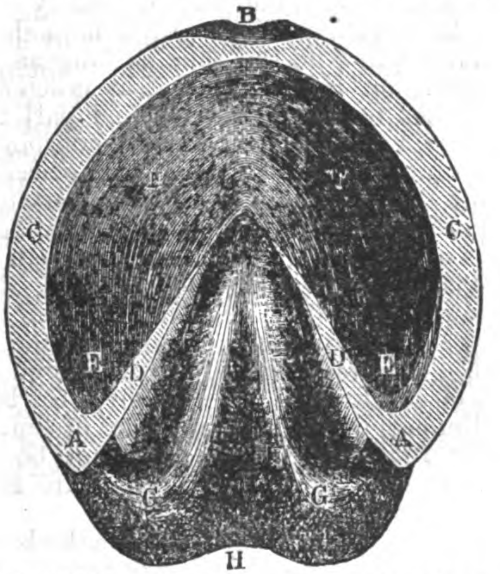
2.12; 2 m.: *Fanny Witherspoon*, Chicago, 1885, Sep. 25: 4.43; 4 m.: *Satellite*, Keokuk, 1887, Aug. 12: 10.52½; to wagon: 1 m.: *Hopeful*, Chicago, 1878, Oct. 12: 2.16½; under saddle: 1 m.: *Great Eastern*, Fleetwood, 1877, Sep. 22: 2.15¾; by teams: 1 m.: *Maud S.* and *Aldine*, Fleetwood (not for record), 2.15½; *Maxey Cobb* and *Neta Medium*, Fleetwood (for record), 2.15¾; in race: *Arab* and *Conde*, San Francisco, 1887, Nov 26: 2.30½, 2.23, 2.18¾. PACING, to wagon: 1 m.: *Johnston*, Detroit, 1887, July 21: 2.14½; in harness: against time: *Johnston*, Chicago, 1884, Oct. 3: 2.06¼; best 3 heats: *Little Brown Jug*, Hartford, 1881, Aug. 21: 2.11¾, 2.11¾, 2.12½; by team: *Daisy D.* and *Silver Tail*, E. Saginaw, 1887, July 15: 2.18½; agt. time with running mate: *Westmont*, Chicago, 1884, July 10: 2.01¾.

HORSE'-RADISH (*Armoracia*): genus of plants of nat. ord. *Cruciferæ*, differing from scurvy-grass (*Cochlearia*) chiefly in having the valves of the seed-pouches destitute of prominent nerves. The species are perennial herbaceous plants, having erect stems and white flowers, and roots remarkable for their pungency, which is owing to a volatile oil, of very powerful odor, believed identical with the volatile oil of mustard. The COMMON H. (*A. rusticana*) has long cylindrical white roots, stems about two ft. high, large, much-veined, oblong, crenate root-leaves on long stalks, and elongate-lanceolate stem-leaves. It is indigenous in e. Europe, whence it was probably introduced into western countries; grows in damp meadows, and is cultivated for its roots, which are scraped or grated down and mixed in salads, or used as a condiment with roast-beef, and other flesh food. H. root is used also in medicine as a stimulant, and is an aid to digestion; it is also regarded as an antiscorbutic; and is sometimes applied externally as a rubefacient instead of mustard. In cultivation, the H. is generally planted very deep. It is very difficult to eradicate it from ground in which it has become established, as almost any portion of the root will grow.—Another species, *A. macrocarpa*, native of Hungary and Transylvania, has much larger flowers, and a rather less pungent root.

HORSE'-RADISH TREE (*Moringa pterygosperma*): tree of nat. ord. *Moringaceæ*, native of India and Arabia. It has bipinnate or tripinnate leaves, with roundish oblong leaflets, terminal panicles of white flowers, and a pod-like, 3-valved fruit, with roundish 3-winged seeds. The leaves, mildly pungent, are used in curries, and with vinegar: the roots, very pungent, are used as those of the horse-radish, from which they are not easily distinguished. The seeds yield the useful fixed oil called *oil of Ben* (q.v.), and the bark a gum like tragacanth. *M. aptera*, another species of the same genus, also a native of the E. Indies, is cultivated in Egypt, Syria, and Italy, for the oil of ben obtained from its seeds. These trees are now cultivated also in the W. Indies, for the roots and the oil.

HORSE-SHOEING. The foot of the wild horse is sufficiently protected from injury by a horny covering called the hoof. The wear to which it is subjected is constantly being repaired by the growth of new material. But when the horse is used for driving or working, the process of repair is much slower than the wearing down of the horn, and he soon becomes footsore and unable to travel. Consequently, it is necessary to protect the hoofs of horses which are to be of service to man. The exceptions to this rule are rare, and are found in horses with unusually strong hoofs, and those which are used only on soft ground and for light work. Protection is given by covering with a piece of iron, called a shoe, that portion of the hoof which would be otherwise exposed to wear.

Shoeing has been performed from an early period, and until quite recently has been done in a most unskilful manner. The work has usually been intrusted to uneducated men, who knew nothing of the anatomy of the horse's foot, and who fitted the hoofs and nailed on the shoes with as little care as they would have fastened pieces of iron to a log. The frog and sole have been pared down, and the crust torn off with a rasp. The shoe has then been made to fit by heating sufficiently to burn the hoof and holding it thereon until a level surface was obtained. It was fastened to the hoof, with large nails driven in the roughest manner. Under such a system, it is not strange that diseases of the horse's foot were frequent, severe, and extremely difficult to cure. Bad shoeing has probably spoiled more good horses than any other single cause of injury which is under the control of man. Na-



A Sound Fore-Foot prepared for the Shoe.

A, A, the heels of the crust; B, the toe cut out to receive the clip; C, C, the quarters of the crust; D, D, the bars as they should be left, with the full frog between them; E, E, the angles between the heels and bars, where corns appear; F, F, the concave surface of the toe; G, G, the bulbous heels; H, the cleft.

vicular disease, laminities, founder, contracted hoofs, thrush, cracks, and various other ills may, in unnumbered cases, be traced to this source. Over-reaching, tripping, and stumbling, also are often caused, and always aggravated by improper shoeing. Of late much more attention has been given to the structure of the horse's foot, and greatly improved methods of shoeing have been devised. The advocates of the new systems are divided into two main classes—those who hold that the frog should be placed on the ground and with the wall of the hoof should bear the weight of the horse, and those who believe that the frog should not be on a level with the surface of the shoe. Each party points to the excellent results of its shoeing as proof that its method is correct. The weight of shoes also has been materially reduced. It has been found that a heavy shoe, which keeps the frog from the ground, will wear out as soon as a light one that allows the frog to touch the surface; that it is much more likely to come off and be lost, and that it greatly increases the labor of the horse in travelling. Light nails should always be used. They will hold the shoe as long as it ought to remain, and will not injure the hoof as much as large and heavy nails. As the shoe protects that part of the hoof which it covers, while the remainder is constantly wearing away, it becomes necessary to remove it occasionally, and by paring off the more rapidly growing part to bring the different portions into their proper relative positions. Some horses need more frequent shoeing than others, but the average is once every four or five weeks. Neither the frog nor the sole should be removed, and the wall of the hoof should be cut away only enough to take off its surplus growth. The rasp should never be used on the wall of the foot, either for making a groove in which to sink the nail clinches, or for the purpose of improving the looks of the foot. The nails must not be too tightly driven, and in removing an old shoe, care is needed to prevent injury to the hoof.

The form of shoes, as well as the methods of shoeing, have been greatly improved in recent years. Special patterns have been devised for horses with feet of peculiar forms, or which were suffering from diseases which the ordinary shoes seemed to aggravate. In cases of spavin, as well as in diseases or injuries of the feet, great relief has been afforded by shoes made to relieve that particular trouble. Among the principal improved shoes used in this country are the Goodenough, named for its inventor; the four-calkin shoe of Robert Bonner; the rolling-ball shoe of Dr. David Roberge, and the wing-heeled centennial shoe of S. T. Harris.

HORSE-TAMING: subduing wild or vicious horses. Most horses are intelligent and docile animals, and if properly treated will never be troublesome. A few are naturally vicious, and a larger number become so by bad training. By skilful management during a course of training, and constant care afterward, a horse that has merely acquired vicious habits may be made serviceable and reasonably safe. A horse with a violent disposition may be tamed by a skilful trainer, but the vicious qualities will be liable to assert themselves whenever restraint is removed. Such horses should be kept only where the work is regular and severe, and they ought always to be regarded as dangerous animals. The man who attempts to tame a vicious horse must be gentle but unyielding. He must be vigilant and fearless, and must never lose his temper for an instant. In some cases he can subdue a vicious animal by passing a small rope around the upper jaw, crossing it in the mouth above the upper teeth, and tying the ends back of the neck. For violent animals the 'Rarey' method is probably the best which has been devised. The yard or floor where the horse is to be trained should be deeply covered with straw. A bridle and surcingle are put on, a strap or rope is noosed around the off fetlock, and the end passed through the surcingle under the horse. The left foot is raised nearly as high as the body, and strapped around the leg. The horse is kept on three feet until he is tired, when he is made to move. As he raises the fore foot the operator pulls it up with the rope, and holds it while the horse falls upon his knees. The horse is held in this position until he is exhausted and turns, or is easily rolled, upon his side. He is then petted and talked to, but is not allowed to raise his head. Under this treatment the horse will soon allow his feet and legs to be handled, and when permitted to rise will be perfectly gentle. A single lesson is usually sufficient, and it is claimed that three trainings will thoroughly and permanently subdue the most vicious animal. Though apparently a simple process, this method requires strength, skill, patience, and courage on the part of the operator. Coolness and self-possession also are indispensable, not only to the success of the effort to subdue a really vicious horse, but, in a still greater degree, are essential to the safety of the man who makes the attempt.

HORSHAM, *hawrs'am:* a borough in the county of Sussex, is situated on a tributary of the Arun, 28 miles n.e. of Chichester, and 35 miles s.s.w. of London. The Court-house, a Gothic edifice; St. Mary's Church, in the Early English style; the Catholic Chapel; the Grammar-school; and the Corn Exchange, are the principal institutions of the town. H. is a borough by prescription, never having been incorporated. It returned two members of parliament from the 14th c. till 1832, and one down till 1885. Pop. (1881) 9,552.

HORSLEY, *hawrs'li*, SAMUEL, D.D.: English prelate: 1733–1806, Oct. 4; b. at St. Martin's-in-the-Fields, London; son of a clergyman. He was educated at Westminster School and Trinity Hall, Cambridge, where, though he studied hard, and laid in immense stores of knowledge, he took no degree in arts. In 1758, he became curate to his father, then rector of Newington, and soon succeeded to the rectory, a living which he held 34 years, receiving in the interval many other preferments. In 1767, H. was elected a fellow of the Royal Soc. The writings that first brought him into notice were scientific, and not theological; e.g. *Remarks on the Observations made in the late Voyage towards the North Pole. for determining the Acceleration of the Pendulum in lat.* 79° 51′ (1774). Two years afterward, he issued proposals for a complete edition of the works of Sir Isaac Newton, which did not make its appearance till 1785. But the grand event in his career was his controversy with Dr. Priestley, which, considering the momentous nature of the subjects discussed, and the splendid talents of the combatants, may be pronounced the greatest theological contest of the 18th c. The impression made by the controversy was, and still remains, that so far as hard, merciless *hitting* goes, H. had decidedly the best of it. Rude in language, but panoplied in learning, contemptuous, defiant, dictatorial, his attitude reminds one of Goliath rather than of the apostle Paul, and suggests that he is, at least, as much inspired by the ambition of the pugilist as by the ardor of the Christian. The tone however, as of a complete and final wisdom, in Dr. Priestley's attack on ancient and treasured doctrines of the church—not unusual with those who deem themselves called to make an end of old corruptions—doubtless tended to give bitterness as well as force to H's criticism. The work that excited the controversy was Dr. Priestley's *History of the Corruptions of Christianity*, among which corruptions was included the orthodox doctrine of Christ's uncreated divinity. H. reviewed the work with great severity in his charge delivered to the clergy of the archdeaconry of St. Albans, 1783, May 22. Priestley replied the same year in *Letters to Dr. Horsley in Answer to his Animadversions*, etc. In 1784, H. retorted in 17 *Letters from the Archdeacon of St. Albans in reply to Dr. Priestley*, etc. These were, in return, met by a new series from Priestley, who, waxing warm with the fight, describes his antagonist as 'the incorrigible dignitary.' After a silence of 18 months, H. again replied in *Remarks on Dr. Priestley's Second Letters*, etc., and in 1789 collected and published the whole that he had written on that subject. Both sides showed fierceness in fight; but H. brought more learning and ability for the discussion of the particular points in issue. Priestley's unusual and admirable gifts were in other departments. H's services were rewarded with the bishopric of St. Davids 1788, whence he was translated to the bishopric of St. Asaph's 1802. As a bishop, he was liberal and humane both to the clergy and the poor of his diocese, though vigilant and strict in the discharge of his episcopal duties. His works, besides those above mentioned, consist of sermons and treatises on biblical criticism, on mathematics, and on classical subjects. A collected ed. of his theological works was published by Longman (6 vols. 1845).

HORT, *hawrt*, FENTON JOHN ANTHONY, D.D.; theologian: b. Dublin, Ireland, 1828, Apr. 23. He graduated at Trinity College, Cambridge, 1850; held a fellowship there 1852–57, and the college living of St. Ippolyts with Great Wymondley 1857–72; was elected a fellow of Emmanuel College, Cambridge, 1872, and after serving seven years as Hulsean lecturer, was elected Hulsean prof. of divinity 1878. He has been examining chaplain to the bps. of Ely and Winchester, Lady Margaret's preacher, a New Test. revisor, member of the boards of theol. and historical studies, and of the senate council of the Univ. of Cambridge. He contributed to the *Dictionary of Christian Biography* and *Journal of Philology*, published *On Monogenos Theos in Scripture and Tradition*, and *On the Constantinopolitan and other Eastern Creeds of the Fourth Century* (1876); and with Dr. Westcott edited a critically revised Greek text of the New Test. (1881), recognized as of the highest value, by scholars.

HOR'TA: seaport in Fayal (q.v.)

HORTATIVE, a. *hŏr'tă-tĭv*, or **HOR'TATORY**, a. *-tėr-ĭ* [L. *hortatīvŭs*, that encourages or exhorts—from *hortor*, I strongly urge, I exhort]: giving or containing exhortation or advice; encouraging.

HORTENSE' (EUGÉNIE HORTENSE DE BEAUHARNAIS—known as La Reine Hortense), Queen of Holland: see BONAPARTE.

HORTENSIUS, *hawr-tĕn'shĭ-ŭs*, QUINTUS: B.C. 114–50; b. Rome: lawyer and orator. He was carefully educated, established his reputation as an advocate when 19 years old, married a daughter of Catullus, became a milit. tribune in the social war B.C. 91–90, defended Pompey when accused of embezzling public booty B.C. 86, was quæstor B.C. 81, ædile 75, præter urbanus 72, and consul 69. He opposed the supersedure of Lucullus by Pompey advocated by Cicero, defended Milo against Clodius, and soon after Pompey's return from the east B.C. 61 withdrew from public life and applied himself wholly to his profession. His career was parallel with that of Cicero, and for many years they were rivals as advocates and publicists. His private character was not without blemish; but he was kind-hearted, generous, and had few enemies.

HORTICULTURAL SOCIETIES: associations for the promotion of gardening and fruit-growing; intermediate between agricultural and pomological societies, but partaking of the nature of both. The first society of the kind was established in London in 1804, and was incorporated some four or five years later. An experimental garden occupying thirty-three acres was opened at Chiswick in 1822. The ground was obtained of the Duke of Devonshire, and the lease is 'renewable forever.' This garden is one of the finest of its kind in the world. The success of the London society led to the formation of similar associations on the Continent and in the United States which have proved of great value to the people at large. In this country nearly every state has its distinctively horticultural society, while large numbers of the county agricultural societies devote considerable attention to horticultural matters, and offer quite a proportion of their premiums for exhibitions in this line. The annual reports of these societies contain much valuable information regarding the newer varieties of vegetables, fruits, and flowers, the best methods of cultivation, and other matters of practical importance to the horticulturist and the farmer. The public meetings also awaken an interest in horticulture, not only in the communities in which they are held, but also by means of reports which are published in the leading papers throughout the country. The number and membership of these societies is increasing, and the work which they perform is assuming a greater degree of importance than it has had in the past. The varieties of vegetables and fruits have become so numerous that reliable information as to their special qualities and their value for general cultivation will save multitudes of growers from loss and disappointment. The increase of insect enemies also calls for intelligent and united effort for their suppression, while information respecting improvements in the methods of growing or marketing is always timely and useful. The most enterprising horticulturists are active members of the societies, and through these channels they give to the public the results of many costly experiments as well as of close study and careful observation.

HORTICULTURE, n. *hŏr'tĭ-kŭl'tūr* [L. *hortus*, a garden; *cultūra*, cultivation]: art of cultivating gardens (see GARDENING). HOR'TICUL'TURAL, a. *-tū-răl*, pertaining to. HOR'TICUL'TURIST, n. *-rĭst*, one skilled in. HORTICULTURAL SHOW, a public exhibition of flowers, fruits, and vegetables.

HORTUS SICCUS, n. *hŏr'tŭs sĭk'kŭs* [L. *hortus*, a garden; *siccus*, dry]: a collection of specimens of plants dried and arranged; a herbarium.

HORUS, *hō'rŭs:* Egyptian god, whose name, *Har*, means 'the day,' or 'the sun's path,' and is generally written in hieroglyphics by the sparrow-hawk, which was sacred to him. The old derivation from the Hebrew *aur*, light, is now recognized as incorrect. Under the name H. were included several deities, as Haroeris, (q.v.), the Elder Horus; and Harpocrates (q.v.), or the Younger Horus; *Har-sam-ta,* Horus, the uniter of the upper and lower world, who was the second son of Athor, resided in Annu, or Heliopolis, and emanated from the eye of the sun (Rosellina, *M. d. c., t.* 47); and *Har-net-ta,* another form of the same god, represented as a boy wearing a triple crown, who existed from the commencement of things, a self-created being, and emanated from the Nu, or firmament; besides several others. But the principal H. was son of Isis (*Har-si-hesi*), represented as a naked child standing wearing a skull-cap, or the crown of Upper and Lower Egypt. H. is mentioned first by Herodotus (ii. 144, n. 156) as son of Isis and Osiris, and brother of Bubastis, the Egyptian Diana. Various accounts are given of his birth; he having been, according to one version, engendered of his father Osiris before the birth of Osiris and Isis; or, according to another account, begotten of Osiris after that god's destruction by Typhon. His birth was said to be premature, and he was consequently weak in his lower limbs. In order to avoid the persecution of Typhon, he was brought up in secret by Leto on the floating island of Chemmis, or Buto. Having grown up, he became *Har-net-atf* (H. the avenger of his father), and, with Isis, avenged his father's death (see OSIRIS); according to the best received tradition, vanquishing Typhon and his associates in a great battle at a village near the city of Antæus, on the 26th of the month Thoth, on which occasion Osiris came from the nether world to his assistance in the shape of a wolf (Diodor. i. 21). According to the Egyptian ritual, he cut off the heads of his foes for the fowls of heaven, and their thighs for the wild beasts and fishes. Typhon is said to have been delivered bound in fetters to Isis, who released him, on which H. tore the diadem off his mother's head, but Thoth replaced it by the head of a cow. H. was often confounded with the elder H. by the Greeks, but the monuments represent him as the type of royalty, the antagonist of Set or Typhon, the avenger of his father Osiris, for whom he obtained the corn of Elysium and the waters of Elephantine, conquered the north and south, and shared Egypt with Set or Typhon, having held the government of the northern portion as Typhon held that of the south. After the death of Typhon, he became sole monarch, and as last king of the dynasty of gods, reigned, according to different versions, 100 or 25 years. Numerous esoteric explanations have been given of this god, as that he represents the Nile, as Typhon represents the desert, the fruitful air or dew which revives the earth, the moon, the sun in relation to the changes of the year, or the god who presided over the course of the sun. He represented also three planets, Jupiter (*Harapshta*), Saturn (*Harka*), and

Mars (*Harteshr*). The sparrow-hawk was sacred to him; so were lions, which were placed at the side of his throne. There was a festival to celebrate his eyes on the 30th Epiphi, when the sun and moon, which they represented, were on the same right line with the earth. A movable feast, that of his coronation, is supposed to have been selected for the coronations of the kings of Egypt, who are described as sitting upon his throne. When adult, he is generally represented hawk-headed; as a child, he is seen carried in his mother's arms, wearing the pschent or atf, and seated on a lotus-flower with his finger on his lips. He had an especial local worship at Edfou or Hut, the ancient Apollinopolis Magna, where he was identified with Ra, or the sun. There were also books of Horus and Isis, probably referring to his legend (Lucian *De Somn. sive Gall.* s. 183). The magnet was called his bone; he was of fair complexion.—Birch, *Gall. of Antiq.* p. 35; Wilkinson, *Mann. and Cust.* IV. 395; Tablonski, *Panth.* II. 4, p. 222; Champollion, *Panth. Eg.;* Hincks, *Dubl. Uni. Mag.* XXVIII. 187; Boeckh, *Manetho*, p. 61.

HO'RUS, King of Egypt, (named HAREMHEBI): reigned at the close of the 18th dynasty. His reign has been placed at B.C. 1661, 1455, or 1446, but it was probably about B.C. 1400. Although the lists of Manetho give him a reign of 36 or 38 years, no earlier monumental date than his seventh year has been found. He restored the worship of Amen Ra, which had been overthrown by the disk or sun worshippers; and conquered the Barubaru, a tribe of the negroes of Kush or Æthiopia. The most southern point where his monuments have been found is Gebel-Addeh, ancient Amen-Heri, between the Wady Halfa and Ibsamboul. He also embellished Luxor and other quarters of Thebes. Fine statues of this monarch are at Turin, and others in the British Museum.—Brugsch, *Geographie des Alten Ægyptens;* Champollion-Figeac, *L'Egypte*, p. 319.

HORVÁT, *hor'vât*, ISTVÁN (Stephen): the Hungarian Varro: 1784–1846; b. Stuhlweissenburg. From early youth through life H. gave his rare abilities to historical research, with the double object of settling the question as to the origin of the Magyars, and of consolidating Hungarian nationality through the scientific development of the Hungarian language. Among his published works, the chief merit belongs to *Magyarország Tösgyökeres Régi Newzetségeiröl* (Primitive Families of the Hungarians, Pesth 1820), an 8vo vol. of moderate size, but whose materials were gathered from innumerable rare manuscripts, and other documents, partly foreign, partly domestic. It is a monumental work in genealogy, connecting some of the living Hungarian families with the chieftains who came with Arpád at the end of the 8th c. In 1814, appeared at Pesth, *Defense of the Kings Lewis the Great and Mathias Corvinus;* in 1821, two vols. of *Answers to the Questions on Philology, put by the National Museum at Pesth;* in 1825, *Sketches from the Oldest History of the Hungarian Nation;*

in 1828,9, *Researches on Biblical Expressions*, etc. H. was for many years editor of, and later, chief contributor to the *Tudom ânyr Gyüj temény*, or Scientific Magazine.

HOSACK, *hŏs'ak*, DAVID, M.D., LL.D., F.R.S.: 1769, Aug. 31—1835, Dec. 22; b. New York: scientist. He graduated at the College of New Jersey, 1789, and in medicine at the College of Philadelphia, 1791; studied two years in England and Scotland; became professor of natural history in Columbia College, 1795; was professor of materia medica and of botany there. 1797–1807; prof. of midwifery and surgery, of the theory and practice of medicine and obstetrics, and of the diseases of women and children in the College of Physicians and Surgeons, 1807–25; and prof. in the medical department of Rutgers Coll., 1825–30. He edited the *American Medical and Philosophical Monthly*, 1810–14; founded the first botanical garden in America; and was a founder and first pres. of the New York Hist. Soc. 1820–28. He was noted as botanist and surgeon, and published many technical works.

HOSANNA, int. n. *hō-zăn'nă* [Gr. *hōsan'na*—from Heb. *hoshiahnna*, save, I beseech you]: an invocation of blessings, which in Hebrew usage passed into an exclamation of praise to God as the giver of all salvation, and an acclamation of the grandest and most joyful public worship. At the feast of tabernacles, the Jews, carrying palm-branches and myrtle, repeated Ps. cxviii. 25, 26, which begins with Hosanna! The feast itself, especially its seventh day, was called the Great Hosanna.

HOSE, n. *hōz* [OF. *house*, a boot—from mid. L. *hosa:* Ger. *hosen;* Icel. *hosa;* Dut. *hose*, boots, leather casings: Bav. *hosen*, a pod, a husk: Dan. *hase*, the husk of nuts]: coverings for the legs; stockings; a flexible pipe for water. HOSE, or HOSEN, plu. *hō'zn*. HOSIER, n. *hō'zhėr*, or *hō'zhĭ-ėr*, a dealer in stockings, etc. HO'SIERY, n. *-zhėr-ĭ*, stockings in general (see below). HOSE-IN-HOSE, in *hort.*, having the calyx in the form of a corolla, so as to give the appearance of two corollas. one within the other.

HOSEA, *hō-zē'a*, BOOK OF: placed in the Hebrew Bible next after Ezekiel. consists of prophecies spoken (according to the superscription) in the days of Uzziah. Jotham, Ahaz, and Hezekiah, kings of Judah, and of Jereboam II., King of Israel—a period of about 60 years; B.C. 784–726. This portion of the history of Israel was one of apostasy from God, commenced by Jereboam, founder of the kingdom, and aggravated by the successive kings. Hosea's prophecies. uttered under such circumstances, may be divided into two parts. I. The first (ch. i.–iii.), under the symbol of a corrupted and unfaithful wife and her children, sets forth the displeasure of God against the sins of Israel; yet promises reconciliation and mercy, after a period of punishment during which the people would be led by calamity and sorrow to turn to the Lord as the only source of good. II. The second part repeats at greater length the denunciations against sin, the calls to repentance, and the promises of restoration and blessing. It has been analyzed as containing a series of six discourses: The first (ch. iv.) denounces the corruption of the people, the rulers, and the priests; the second (v.-vi. 3) emphasizes the responsibility of the priesthood for the corruption of the people; declares that calamities would come on them notwithstanding their plans to obtain foreign help; and foretells their return, torn and smitten, to the Lord. The third (vi. 4—vii.) renews the charge against Israel as fickle, rebellious, and silly in seeking help from Assyria and Egypt, after all their bitter experience that such alliances brought calamity and ruin. The fourth (viii.-ix. 9) denounces once more the wilful and persistent guilt of the people, and declares again that the day of retribution is at hand. The fifth (ix. 10—xi. 11) affirms that in the three great periods of their history—in Egypt, the wilderness, and their own land—Israel had requited God's loving-kindness by turning to idolatry. But, notwithstanding all this, the Lord declares that he cannot give them up as he is God and not man, the Holy One in the midst of them. The sixth (xii.-xiv.) closes the book with a renewed exhortation to repentance and a renewed promise of restoration to the favor of God: 'Take with you words and return to the Lord; I will heal their backslidings.' Hosea's mind, it has been said, was greatly agitated under the burden of preaching against the sins of his people, and of announcing their consequent doom. Hence his abrupt style, disconnected sentences, and undeveloped figures of speech. Combined, however, with the dark exhibition of the divine displeasure against sin which the book contains, there is also the light of reconciling love shining on the corrupted people. In this combination lies the prophet's peculiar power.

HOSHANGÁBÁD, or HOSHUNGABAD, *hō-shŭng-â-bâd′*: town in Central India, on the left or s. bank of the Nerbudda, which here divides British territory from Bhopal. It is a town of considerable commercial importance, cap. of a dist. of the same name in the Central Provinces. Pop. of town (1881), 12,000.

The district of H. has 4,437 sq. m.; is so fertile as to be styled the garden of the country, and possesses abundance of excellent coal. Pop. 488,787.

HO′SIERY: in its most limited sense, stockings (hose); but in its more general application, all knitted goods made by hand or by machinery. The use of stockings originated in the cold countries of the north, and probably the first were of skins, and subsequently of cloth; they were also, until a comparatively late period, made all in one piece with the trousers, constituting the trunk-hose of our ancestors; but these garments were separated; and the art of knitting was invented, it is supposed in Scotland, about the commencement of the 16th c. Certain it is that knitted stockings found their way to France from Scotland, and led to the establishment of a guild of stocking-knitters, who chose for their patron saint St. Fiacre of Scotland. In 1589, William Lee, of Woodbridge, Nottinghamshire, entirely altered the hosiery trade, by inventing the knitting-frame; and though he did not live to receive much benefit from it, it soon became a very important aid to the commerce of Britain. During the Protectorate, the stocking-frame knitters obtained a charter, and extended their operations through the provinces of England, but with all the disadvantages of a monopoly, which eventually led to legal proceedings, by which the charter was set aside, 1753. Since that time, many improvements have been made in the stocking-frames, and a large proportion of the stockings now worn through the world are made by the manufacturers of Great Britain. See STOCKING-FRAME.—Stockings are of cotton, of worsted, or of cotton and worsted mixed, called Angola, and of silk. From each material they are made of two distinct kinds. The best are made in a flat web, which has to be sewn at the back as well as the foot, and it is so made that when the two edges are brought together at the back, they give the form of a calf. The common or *racked* stockings are woven in a circular frame, and form a cylindrical web of equal width from top to bottom; these have to be stretched on boards to give them the shape, and are ironed with hot irons while on the board, to make them retain the shape of the board. The foot is formed by cutting the web and adding a small piece for the sole. Nottinghamshire, which gave birth to the inventor of the stocking-frame, is still the centre of the hosiery trade in Great Britain. Stockings of very fine quality are produced at Belper, Derbyshire. There are extensive manufacturies of H. in New England and New York.

HOSIUS, *hŏ'sĭ-ŭs* (or OSIUS), THE SAINT: Bishop of Cordova: about A.D. 256–359; b. in Spain or Egypt. Of his early life nothing is positively known. He became bp. of Cordova about 296, came near losing his life during the Maximinian persecution 303–305, was conspicuous in the Council of Iliberi, 306, had established intimate relations with Constantine the Great 313; was sent by the emperor to Alexandria to reconcile the differences between Alexander the bp. and Arius his deacon 323, is believed to have procured the convening of the Council of Nice, of which he was a member, and, some say, pres. 325, and, whether or not the author of the creed there adopted, influenced Constantine to ratify it. In 347, he presided at the Council of Sardica, which showed extreme hostility to Arianism, and after its close became an open and active supporter of his friend Athanasius. Constantine commanded him to oppose the Athanasian doctrines, 355, and on his refusal banished him to Sirmium, where after passing his 100th year he was induced to take communion with the Arians 357. He was then recalled to Cordova, but to his dying hour refused to condemn Athanasius.

HOSMER, *hŏz'mėr*, HARRIET: artist in sculpture: b. 1831, Watertown, Mass. As she had a feeble constitution, her father, a physician, encouraged her to strengthen it by out-door exercises, and she became an adept in shooting, riding, rowing, skating, and swimming. She also showed a talent for sculpture by modelling figures in clay. To prepare herself for her chosen career, she studied anatomy, first with her father, afterward at the medical college at St. Louis. Returning to her home, 1851, she modelled her first work, *Hesper*, which had so decided a success that she was sent to Rome, where she became the pupil of Gibson. In his studio, she modelled busts of *Daphne* and *Medusa*, and a statue of *Œnone* and the much admired statue of *Beatrice Cenci* for the Mercantile Library of St. Louis. Some 30 copies of her statue of *Puck* were ordered from her shortly after its completion. Her most ambitious work is a colossal statue of *Zenobia in Chains*. The *Sleeping Faun* is one of her best works.

HOSPICE, n. *hŏs'pēs* or *hŏs-pēs'* [F. *hospice*, a hospital—from L. *hospĭtĭŭm*—from L. *hospĕs*, a guest]: establishment for sheltering travellers, maintained by monastic persons, usually in connection with monasteries. One of the best known in inhospitable regions is on the Alpine pass of Great St. Bernard (see BERNARD, GREAT ST.), which the priests of the canton of Valais gained possession of 1825, and afterward fitted up in a comfortable manner. A H. likewise existed on St. Gothard as early as the 13th c.: at present it is inhabited not by monks, but by a hospitaller, who entertains travellers gratis, and accepts no remuneration beyond a present. Similar establishments are on Mont Cenis, the Simplon, and the Little St. Bernard.

HOSPITABLE, a. *hŏs'pĭ-tă-bl* [F. *hospitable*—from L. *hospĭtālĭs*, hospitable, friendly—from *hospĕs*, a guest, a visitor: It. *ospitabile*, hospitable]: receiving and entertaining friends or strangers with generous kindness; offering kind reception; proceeding from or indicating kindness. HOS'PITABLY, ad. *-tă-blĭ*. HOS'PITABLENESS, n. *-bl-nĕs*, disposition to entertain others, and do them kind acts. according to ability, especially to strangers.

HOSPITAL, n. *hŏs'pĭ-tăl* [OF. *hospital*—from mid. L. *hospitālĕ*, a large house or palace—from L. *hospĕs*, a guest, a visitor]: a house for the reception and aid of the sick, infirm, or poor (see HOSPITALS below). HOSPITAL, in *English law*, eleemosynary corporation founded for supporting certain descriptions of persons. In Scotch law, it more frequently signifies a mortification or endowment for the education as well as support of children. **HOS'PITAL'ITY**, n. *-tăl'ĭ-tĭ*, kindness and generosity to strangers or guests. **HOS'PITALLER**, n. *-lėr* [F. *hospitalier*]: in the *middle ages*, one of a body of men at Jerusalem who devoted themselves to protect pilgrims and relieve their necessities—so called from two hospitals erected there for that purpose, from whom sprang the order of the Knights of St. John of Jerusalem, subsequently known by the name of the Knights of Malta. Such charitable brotherhoods have been founded at various times and in different countries, for the care of the sick in hospitals. The vow to devote themselves to this work of mercy is, in all these brotherhoods, superadded to the ordinary vows of poverty, chastity, and obedience common to all the religious orders in the Church of Rome. One of the earliest recorded instances of a hospital served by such a brotherhood is that of Constance in 13th c. See ST. JOHN OF JERUSALEM, KNIGHTS OF: TEUTONIC KNIGHTS The hospitallers of Our Lady of Christian Charity were founded near Chalons in the end of the 13th c. by Guy de Joinville; a similar body at Paris 1294; and the hospitallers of Our Lady Della Scala about the same time at Siena. There are many other local institutes or congregations. **HOSPITALISM**, n. *hŏs'pĭt-ăl-ĭzm*, the prejudicial influences of large hospital buildings upon sick residents, especially when the patients are numerous; the subject of hospital construction. DAMES OF THE HOSPITAL: see SISTERS OF CHARITY.

HOS'PITALS: institutions for medical treatment or care of the sick or injured or infirm, especially for the poor. The mediæval *hospitia* in some cases were H. for the reception and relief of lepers, whose malady was one of the scourges of Europe. These leper H. in England and Scotland were often called 'Spitals;' hence the frequency of such names of places as Spital, Spitalfields, etc. The leper H. and other kinds of the old hospitia, disappeared with the improvement of society, and substitutes for them on a broader scale began to be established in the modern form of hospitals. Of public establishments under this general designation, there are now several distinct classes—e.g., H. for the reception and treatment of the sick and hurt, for the board and education of children, and for the reception and permanent board of poor old persons of both sexes. H. of these several classes are numerous and on a munificent scale in Great Britain and in the United States—taking the position of leading charities. For some of the more remarkable hospitals see their respective titles.

H. for the sick and hurt, sometimes termed Infirmaries, are now established in all parts of the civilized world supported, as in England, on a principle of charity, or, as in

France, chiefly from the funds of the state or the civic municipalities, or as in the United States by both methods, the basis and main reliance, however, being usually municipal or civic. They are indispensable as a refuge to all who are unable to pay for private medical or surgical aid, or as a convenient means of succor on emergencies to persons of every degree of opulence. In numerous instances they are serviceable also as schools for medicine and surgery; as such, no university, at which these and kindred branches of learning are taught, can be said to be complete without the adjunct of a well-organized hospital, where professors can practically educate their pupils by pointing out varieties of disease and injuries, and exemplifying methods of treatment. Hence, the best specimens of H. are found in university towns, or in towns famed for schools of medicine and surgery. The older of the London H. are, St. Thomas's, 1553; St. Bartholomew's, 1546; and Bethlehem, 1547. A considerable accession to the number took place in the reign of George II.; when society became alive to the value of such institutions. It was at this period that the Royal Infirmary of Edinburgh was established (1736). The antiquity of British H. sinks into insignificance in comparison with that of some institutions of this kind on the continent. The Hôtel Dieu in Paris, alleged to be the most ancient hospital in Europe, was founded in the 7th c., and long known as the Maison Dieu, received the benefactions of successive sovereigns. It is now conducted on a stupendous scale. Houses of this kind in France usually receive valuable aid from a religious sisterhood, renowned for its practical benevolence, the Sisters of Mercy. A striking example of these women's unselfish and useful labors is furnished at the great hospital for the sick and hurt at Lyons, where the entire establishment—cooking, nursing, dispensing medicine, etc.—is gratuitously conducted by them.

In London, Paris, New York, and very many other large seats of population, the pressure for admission by patients, and the necessity for classifying and properly attending to large numbers, have led to the establishment of H. for special departments of medical practice. Thus, beides the general H., there are now lying-in H., ophthalmic H., consumptive H., children's H., etc., each with its peculiar accommodation; and its appropriate staff of officials. Independently of these, there are H. for treatment of mental maladies, of which Bethlehem and St. Luke's in London, and the establishments in Paris, known as Hospices, are examples. To this class of institutions belong Lunatic Asylums (q.v.), also asylums for the reception and treatment of naturally imbecile children. To all these institutions under civic administration, are to be added those H. maintained by various governments for the military and naval services.

Not the least among the benefits of H. to a community, is the fact that, by their prompt and liberal action, they interpose to check contagious distempers which, if unchecked on their outbreak might invade families far above the need of gratuitous medical attendance. On this ground, as well as from sentiments of benevolence, H. or infirmaries are the objects of solicitude to the general community; it being customary for wealthy individuals to bequeath sums toward their support, and for public subscriptions and church collections to be made for them annually. In some cases, besides the infirmaries so miscellaneously sustained, H. are erected and maintained wholly by endowment.

Internally, a hospital building is usually arranged in wards, each under its own nurses, with general superintendents, and a suitable body of servants. Being open night and day to receive pressing cases, there is a resident surgeon with assistants constantly in attendance. Scrupulous cleanliness, quiet, decorous conduct, exclusion of intoxicants and of miscellaneous visitors, are among points principally attended to by the managers.

The Middlesex Hospital, parish of Marylebone, London, may be taken as a fair specimen of a general hospital in England. It is a large building, in the form of the letter H, which admits of thorough ventilation in all the passages. It comprehends 310 beds, of which 120 are for medical, and 190 for surgical cases. Three wards are set apart for the reception of 26 poor women affected with cancer, a class of cases when seemingly incurable not usually admitted into general hospitals. The staff consists of three physicians, who take charge of the medical cases in the wards; a physician-accoucheur, who devotes himself to the diseases peculiar to women and infants, and who superintends the maternity department; four surgeons, who take charge of the surgical patients; and assistant physicians and surgeons, who take care of out-patients. Resident house-surgeons and an apothecary with assistants, attend to all emergencies in the absence of physicians and surgeons, and summon them if necessary. Attached to the hospital are a chaplain and secretary. The physicians and surgeons, who give their services gratuitously, act as professors in the medical college The management is conducted by governors, and a medical and weekly committee. In and out door patients are admitted or treated on letters of recommendation from governors or subscribers to the funds, but in cases of cancer and diseases of the eye, and in cases of emergency, the recommendation is dispensed with. The annual number of patients received into the hospital is about 2,100 and 18,000 receive attendance at their own homes. No lying-in patients are now admitted into the hospital, but about 800 poor women are yearly delivered at their own dwellings, by pupils and midwives, under the direction of the physician-accoucheur. The total expense incurred is less than £11,000, of which more than a half is from endowment, and the remainder from subscriptions, donations, legacies, and miscellaneous collections. A separate fund is provided to assist poor patients leaving the hospital, who may be deficient in clothing or other necessaries.

While in the main the H. recently planned or erected in the United States follow what is known as the parallelogram form, advantage has been taken of the latest discoveries in sanitary science, and the distinguishing novelties are found in improved methods of lighting, draining, ventilating, and plumbing. Municipal legislation and private charity have added largely to the number of these grand institutions through the country within recent years All are deserving of the warmest commendation; but without attempting any invidious distinctions, attention is directed to the institutions whose novelty and extent entitle them to particular notice. The first is the New York Cancer Hospital, on 8th ave. near Central Park, founded by the wives of John Jacob Astor and Gen. George W. Cullom. This is distinguished from all others on account of being the first building of its character in the United States erected on the circular ward plan, observed in the great Stuyvenberg Hospital in Antwerp, Miller Memorial Hospital in Greenwich, England, and Hampstead Hospital, England. The institution was projected about the time of Gen. Grant's fatal illness, and one pavilion built by Mrs. Astor for women alone was opened 1887, Dec. 7. A year later Mr. Astor began the erection of a second pavilion, for men only, as a memorial to his wife, who had died in the meantime, the total Astor gifts amounting to $300,000. The wards are uniformily 40 ft. in diameter, with accommodations for 13 patients each; are lighted on two-thirds their wall surface; and ventilated by openings in the exterior walls between the windows, as well as by a hollow iron column in the centre of each apartment connected with a powerful fan in the cellar. The absence of angles and corners promotes cleanliness, and the radiate arrangement of beds facilitates the work of the nurses by permitting more space between the heads of the beds, and is said to render the apartments far more cheerful than those constructed on the parallelogram form. The kitchen and dining-rooms are on the top floor, and the hospital is provided with the usual administrative offices, operating theatre and nurses' quarters, together with a pretty chapel. Thus far nothing but praise of the institution and its arrangement has been heard; the enterprise is yet too young to yield results that will demonstrate the truth or falsity of the opinion held by many American physicians, that a circular sick room, from the monotony of its walls, exerts such a depressing influence on the minds of the patients that curative treatment is retarded and derangement liable to occur.

The second noticeable institution is the Johns Hopkins Hospital in Baltimore, opened 1889, May 7, which is the largest, most richly endowed and completely equipped hospital in the United States, and probably in the world. A few months before his death 1873, Johns Hopkins (q.v.) gave property valued at $4,500,000 to a board of trustees with which to erect a hospital for free treatment of the indigent sick and injured of the city and state irrespective of age, sex, or color. The trustees inclosed and beautified 14½ acres of ground of his estate, and erected thereon 17 buildings which with their furniture and accessories cost

$2,050,000. Through prudent management of the trust, this result was accomplished without taking a dollar from the principal of the endowment. The trustees anticipating some of the possibilities of so vast an institution, decided to extend its usefulness beyond the limits proposed by its founder, and according provided for the reception of such persons as were able to pay for the superior treatment that the institution would afford, the training of nurses, the education of physicians and surgeons, and the publication of technical monographs on cases of general professional interest. When completed the institution will comprise 25 buildings, neally all of Baltimore pressed brick, Cheat river stone trimmings, and iron. The administration building, the centre of the main front, is 225 ft. long by 100 ft. deep, with a dome reaching a height of 200 ft. It contains the offices, reception rooms, library, and private apartments of the physicians, surgeons, and medical students. The dispensary and lecture buildings are each 114 by 75 ft. The former contains a perfectly appointed pharmacy, dining-room for the resident staff, and two stories of sleeping apartments for resident attendants; the latter has accommodations for 250 students. The nurses' quarters are in a 4-story building, and the kitchen in a building 75 ft. sq. and three stories high. The male pay ward is 130 by 70 ft.; the octagon ward 130 by 60 ft. and two stories high; the common wards each 160 by 75 ft.; and the isolated ward 166 by 45 ft. Separate buildings are provided for autopsies and pathological research, and for washing and disinfecting clothing. All the buildings excepting the laundry and pathological are connected by covered corridors for the use of convalescent patients. The isolated ward building is the most remarkable one of its kind ever constructed. The floor, like those of the other buildings for patients, is 1 ft. above the ground, and intersected by a corridor 9 ft. wide, 35 ft. high, and 166 ft. long, which rises above the main roof and has 48 windows for light and ventilation. On each side the corridor are the rooms, each 14 by 12 ft., and accessible through two doors, one opening inward, the other outward, thus preventing the passage of currents from the rooms to the corridors. Each room is provided with a fire-place in addition to the ordinary supply of heat from hot-water coils; has its own distinct system of ventilation; and a separate earth closet built in the walls, thoroughly ventilated, and accessible by attendants from the corridors. These wards are for patients who may develop maladies requiring isolation; no cases of contagious disease being admitted to the institution.

In some degree allied or auxiliary to H., are two kinds of establishments. The first are public *Dispensaries*, where, at stated hours, medical advice and medicines are given gratis to applicants; and though like other forms of charity liable to abuse, it is allowed that these institutions are of much value in poor communities, and also like H. are efficient in staying the course of contagious distempers. The other institutions referred to are those called in France

Maisons de Santé—private H. for reception and treatment of patients who are able and disposed to pay a small sum for board and medical or surgical attendance. A common charge in France is from three to five francs a day. Under the name of *Sanatorium* this kind of institution has been introduced into England; and more extensively into the United States, where they are of various degrees of size and elaborateness.

H. for the board and education of the young are more varied in character and more numerous in Great Britain than in any other country in the world. Consisting mostly of large and handsome buildings, in salubrious situations in the environs of cities, some are specially adapted for boys, some for girls, less frequently for both; some are maintained by endowments from deceased benefactors, some by funds connected with trade incorporations, and some by casual donations and subscriptions. The oldest, and those on the most munificent scale, are for boys; e g., Christ's Hospital, London; Heriot's Hospital, Edinburgh; and Donaldson's Hospital, Edinburgh. To this class belongs likewise the Girard College, Philadelphia, which costing for construction nearly two millions of dollars, and giving accommodations to more than 300 orphans, is not excelled in architectural grandeur, or in munificence of private endowment, by any European hospital for children. In all of this class of institutions in Great Britain there is similarity of arrangements. The inmates are assumed to be orphans, or the children of parents in reduced circumstances; they are admitted at about six or seven years of age. and kept till about fourteen; they receive gratuitous board and education within the establishment; and they wear a uniform according to the fancy of the directors—the dress being in some instances in England antiquated and ridiculous. There is ordinarily keen competition among parents and guardians to procure admission of children into these H., for the benefit to be secured is deemed equal to a gift of $1,000 to $2,500. Hence, as may be supposed, the charity so called, is frequently abused. As residence within such establishments for a period of six or seven years, interrupted only by holidays, involves a withdrawal to that extent from the family circle, serious objections have lately been taken to the marked and necessary deficiency of hospital training. On this ground, as well as from their pauperizing tendency, H. for children are losing public esteem, and extended in number beyond all reasonable bounds, as they are in Edinburgh and some other places, are remonstrated against as being inconsistent with sound social economy. Institutions of this class for children, are not so numerous in the United States, and are so managed as to command high public regard: they are known seldom as H., usually as Orphan Asylums. or Children's Homes.

H. for indigent old men and women are found in several European countries, but nowhere are they so common as in Great Britain and the Netherlands, where begging is rigorously proscribed by the police, and almsgiving assumes the character of rates for support of the poor. The workhouses for the reception of parish paupers are the humblest variety of these hospitia, though as seen in parts of England and Scotland, they are on a vast scale of accommodation, adapted to the wants of unions or clusters of parishes. Considerably above these in point of comfort and liberality of management, are the H. endowed by individuals or by incorporations for persons who once occupied a respectable position, and have through misfortune lapsed into decayed circumstances. Almost every city of any note in the United Kingdom has one or more of this species of H.; the claim for admission being ordinarily a privilege of local burgesses or members of incorporated crafts.—In the United States almost every city of size has such institutions, often supported by charitable gifts and subscriptions; they are usually called Retreats, Homes, or Asylums. Analogous to this class of institutions was Greenwich Hospital for superannuated mariners connected with the Royal Navy, and the Military Hospital, Chelsea. In England there are numerous establishments called Almshouses, which are of the nature of H. for indigent men and women of respectable character, but with this difference, that instead of all living in wards under one roof, the inmates are provided each with a small dwelling, each receiving the means of separate livelihood therein. These establishments, consisting of clusters of neat small cottages in contiguity, or of separate dwellings grouped in the form of a spacious building, abound in London and its vicinity. At St. Cross, near Winchester, and at Coventry, are Almshouses curious from their antiquity and external appearance. The noblest example of this class of institutions is the Charter House, London: see CHARTER-HOUSE.—In the United States, Almshouses are provided frequently by the counties, sometimes by cities and towns, and are numerous: they are seldom called H. unless they are for the sick or the injured: but many of them have H. attached.

HOS'PITALS, MILITARY: establishments for the reception of the sick and wounded of an army. The smallest is the Regimental Hospital, under the medical officers of the regiment; next, is the Division Hospital, presided over by staff medical officers, for the benefit of all the corps in the division; lastly, there is the General Hospital, applicable to the whole force. In the United States, with its very small and scattered army, there are two permanent military hospitals—one for cadets at West Point, the other at Washington. The other hospitals are post-hospitals—small temporary wooden structures, holding 12 to 24 beds, and built to last 10 years. In these hospitals, the medical officers are responsible to the war department for all purely medical functions. With regard to discipline, inspections, and other military duties, the principal medical officer is responsible to the commandant of the regiment or division, who in his turn is answerable to the commander-in-chief for the state of the hospitals in his command.

During the civil war in the United States, 12,155 physicians entered the medical service of the federal govt. From 1861, May till 1866, June 30, over 5,825,000 cases were treated on the field and in the hospital, of which 273,175 were from wounds received in action. In 1865, Jan., there were more than 200 general hospitals of large extent, 4 sea going hospital transports equipped with stores and supplies for 5,000 patients, a large number of river steamers and railroad trains fitted up for hospital purposes, and hospitals for each army, milit. camp, corps, and post in the service. In the early part of the war any convenient building at scenes of actions was taken for a hospital; and as the number of convalescents increased, large buildings, such as factories, in cities accessible by rail or water from the field hospitals, were hired and fitted up by the govt. These constituted the general hospitals of the service. The base hospitals of the large armies were constructed either of continuous A or 4x4 canvas tents, of rough log-sided pavilions with fly tops, or of all-wood pavilions; the wards in general radiating from a common centre like the spokes of a wheel, though the local exigencies of the service usually determined the character and style of construction. The Hicks Hospital near Baltimore, on the wheel plan with administration buildings in the centre; The U.S.A. General Hospital at W. Philadelphia, nearly a parallelogram in shape; and the Lincoln Hospital at Washington, D.C., *en échelon* in a triangle, were types of large general hospitals, constructed comparatively at leisure, and with all practical regard for the comfort of the inmates. A one-story structure with wards 25 ft. wide, 14–16 ft. high, and of sufficient length to accommodate 32 beds with 100–120 sq. ft. of floor space to each, with windows opposite each other e. and w. and a hard-wood floor, is a favorite form and size among experienced physicians and surgeons, and the one generally adopted by the medical bureau of the war dept. in sudden epidemics.

HOSPITALS, NAVAL: in general, establishments for the reception of sick or wounded seamen, served by naval medical officers. In the United States (1889) the term is correctly applied only to the hospitals at or near the navy yards at Brooklyn, Philadelphia, Boston, Washington, Norfolk, and San Francisco, and the establishment maintained by the U. S. govt. at Yokohama, Japan. These all are served by the medical corps of the navy dept. Their operations are small in comparison with the necessities of seamen as a class, being almost wholly confined to the officers and men of the U. S. navy. A separate institution is provided for seamen of the mercantile marine, which cares for sick and disabled seamen of American vessels, and, under light conditions, those belonging to foreign ships. This is officially known as the U. S. marine hospital service, was established by act of congress 1798, July 16, and forms a distinct bureau of the treas. dept., with a corps of physicians and surgeons independent of regular naval or other control. Hospitals are established at the chief customs ports; and the service is maintained by a tax of 40 cents per man per month levied on the seamen of all American vessels, payments by sailors from foreign ships when admitted on the order of their consuls or captains

($1 per day), and deficiency appropriations by the federal govt. In a single year this service has received the prescribed contributious from 170,000 American sailors, treated 20,922 in its various hospitals, and furnished medicine to nearly 10,000 out-patients, or sailors not sick enough for attendance in the hospitals. The surgeons of the service, on the application of the master, owner, or agent of any vessel of the United States, are required to examine physically any person desiring to ship on board of any such vessel, in order to determine his seaworthiness; and the board of supervising inspectors of the U. S. steamboat inspection service require that no pilot shall be allowed to take out a license till he shall produce a certificate of examination from a medical officer of the U. S. Marine Hospital Service that he suffers from no defect of vision.

HOSPODAR, n. *hŏs′pō-dâr* [Boh. *hospodar*, host, landlord; *hospod*, lord: Russ. *gospodarj*, a lord or master]: in *Moldavia* and *Wallachia*, formerly a governor, chief, or prince under the Sultan of Turkey: now the Prince of Roumania is known under the native Romanic title *Domnu*. Another Slavonic term, *wojewod*, also was often given to the H., the term wojewod signifying the right and dignity of leading the army (thus identical with duke), while hospodar (gospodar, gospod, gospodin, in the various Slavonic dialects) means simply, master (dominus). Formerly, the Lithuanian princes likewise were called *hospodars*, and the Polish kings till the time of Sobieski, assumed this title in their diplomatic negotiations with Russia. *Gosudar* (ruler, monarch) is even now the title of the emperor of Russia, and in conversation signifies master. See MOLDAVIA AND WALLACHIA.

HOST, n. *hōst* [OF. *hoste;* F. *hôte*, a landlord, a guest—from L. *hospĭtem*, a guest, a stranger: comp. Gael. *osda*, an entertainer, a receiver of guests]: one who entertains a friend or stranger at his own house; the landlord of an inn: V. in *OE.*, to give entertainment to another; to live at an inn or hostel. HOST′ING, imp. HOST′ED, pp. HOST′ESS, n. [OF. *hostesse*]: a woman who gives entertainment.

HOST, n. *hōst* [OF. *host*, an army: a contr. of the mid. L. phrase *bannīrĕ in hostem*, to order out against the enemy—thus, in mid. L. *hostis* first signified the enemy, then the military service itself, and finally the army on duty]: an army; any great number or multitude. HOST′ING, n. in *OE.*, a muster of armed men; a hostile encounter. To RECKON WITHOUT YOUR HOST, in any proposal or scheme not to take into account opposing or adverse elements; or, in living in a *hotel*, to take no account of extras in calculating the expenses which the *host* may charge: see HOST 1 and Wedgwood.

HOST, n. *hōst* [F. *hostie*, the consecrated wafer—from L. *hostĭă*, a victim or sacrifice]: in the *R. Cath. Chh.*, the consecrated wafer or bread of the Eucharist—called by that Church, when used, the sacrifice of the Mass. It is so called in conformity with the doctrine that the Eucharist is a ‘sacrifice’ in the strict sense of the word. The host in the Latin Church is a thin circular disk of unleavened bread, made of the finest flour, and generally bearing some emblematic device, as the Crucifixion, the Lamb, or some words or initials of words having reference to the sacrifice. In the Greek and other Oriental churches, as well as in the various Protestant communities, the Eucharist is celebrated in leavened bread, differing from ordinary bread only in being of finer quality; and one of the grounds of separation from the West alleged by Michael Cerularius was the western practice of using unleavened bread. The Greek and Prot. controversialists allege that, in the early church, ordinary or leavened bread was always used, and that our Lord himself, at the Last Supper, employed the same. Even the learned Cardinal Bona, and the Jesuit Sirmond, are of the same opinion; but most Roman divines, with the great Mabillon at their head, contend for the antiquity of the use of unleavened bread, and especially for its conformity with the institution of our Lord, inasmuch as at the paschal supper, at which 'he took bread, and blessed, and brake it,' none other than the unleavened was admissible (Exod. xii. 8, 15; Levit. xxiii. 5). See Klee's *Dogmatik*, iii. 190.

Elevation of the Host.—In the fourth part of the celebration of the sacrifice of the mass in Rom. Cath. Churches, immediately after the consecration of the bread and the utterance of the words 'This is my body,' the officiating priest kneels a moment in prayer, then rising and facing the congregation, raises the host above his head that all present may adore it. The same act is performed with the cup at the words 'This is my blood.' At both elevations a small bell is rung by an altar attendant, and in many religious establishments and churches a large bell is struck three times, that the sick and those otherwise detained from the service may be informed of the moment of the elevations. In the Greek liturgies the elevation of the eucharist takes place shortly before the communion, and in former times the Latin priests elevated only at the words *omnis honor et gloria* just before the *Paternoster*. The present moment of elevation (immediately after consecration) was prescribed about 1100 as a protest against the denial of transubstantiation by Berengarius, and the ringing of the bells was first introduced in the 12th c. in France.

HÖST, *höst*, JENS KRAGH: 1772, Sep. 15—1844, Mar. 26; b. St. THOMAS: Danish historian. The great aim of his literary career was to create a conviction of unity among the Scandinavian nations. With this view, he established, in company with Nyerup, Pram, and Baggesen, the Scandinavian Literary Soc. which originated the journal *Scandinavian Museum*. His most important work is *Count Struensee and his Ministry* (3 vols. Copenh. 1824), the first attempt to delineate, in a thoroughly impartial manner, the events of that singular period in Danish history. Among his writings are: *Svenske Blade; Euphrosyne; Dannora; A Swedish Grammar and Dictionary for Danes; Lectures on the Swedish Language and Poetry; Life and Government of Gustavus Adolphus; Memorials of the Life and Govern-*

ment of Christian VII.; and History of the Danish Monarchy under Christian VII.

HOSTAGE, n. *hŏs'tāj* [OF. *ostage* or *hostage*—from mid. L. *obstāgĭă* and *obstātĭcus*, a hostage—from L. *obsĭdātus*, the act of being made a hostage, or the condition of one—from *obses*, the one staying or remaining in a place, a hostage]: person left in the hands of an enemy as a pledge for the performance of the terms of an agreement. One given in pledge for the performance of conditions. When a town capitulates, victors and vanquished usually give into the custody, one of the other, several officers, as pledges that each party will duly carry out the terms stipulated. When the terms are fulfilled, the hostages are exchanged; but if the terms be evaded, the opposite side holds the right to put to death, or otherwise punish the hostages in its possession. In modern civilized warfare, the circumstances would have to be very remarkable indeed to be held to justify execution of a hostage.

HOSTEL, n. *hŏs'tĕl*, and Hostelry, n. *hŏs'tĕl-rĭ* [OF. *hostel*, an inn—from mid. L. *hospĭtālĕ* (see Host 1, Hospitable, and Hotel)]: an inn; a public lodging and boarding house. Hostel is now spelled Hotel, and Hostler spelled Ostler.

HOSTESS, n. fem.: see under Host 1.

HOSTILE, a. *hŏs'tĭl* [F. *hostile*—from L. *hostīlĭs*, hostile—from *hostis*, an enemy]: adverse; unfriendly. Hos'tilely, ad. *-lĭ*. Hostil'ity, n. *-tĭl'ĭ-tĭ* [F. *hostilité*]: open warfare; attacks of an enemy; violence or animosity.—Syn. of 'hostile': contrary; opposite; inimical; repugnant; adverse; warlike; malevolent;—of 'hostility': animosity; enmity; opposition; violence; aggression.

HOSTLER, or Ostler, n. *ŏs'lėr* [F. *hostel* or *hôtel*, a lodging, an inn, a residence: OF. *hostelier*, an innkeeper: comp. Gael. *ósd*, an inn; *osdair*, an innkeeper]: a man who has the care of horses at an inn or hotel.

HOT, a. *hŏt* [Dut. *heet;* Icel. *heitr;* AS. *hát*, hot: from Heat, which see]: having much heat; fiery, as temper; violent; furious; biting; pungent in taste. Hotly, ad. *-lĭ*, in a hot manner; vehemently; passionately; lustfully. Hot'ness, n. *-nĕs*. Hot bath, a bath of hot water or of vapor. Hot-blooded, having a quick temper; irritable. Hot-brained, *-brānd*, violent; rash. Hot-headed, violently forward; unrestrained in passion; vehemently impulsive. Hothouse, n. a building covered with glass and heated, for rearing plants. Hotbed, n. any place favorable to rapid growth (see below). Hot-blast, heated air blown into a furnace for smelting iron or other ore. To hot-press, to apply heat with pressure, in order to give a smooth and glossy surface. Hot-pressing, the mode of giving a glossy appearance to paper, linen, etc., by heat and pressure. Hotspur, n. *-spėr* [*hot*, and *spur*]: a violent, passionate, and heady man. Hot'spurred, a. *-zpėrd*, vehement; passionate and rash; rashly impetuous. Hot-cross-buns, on Good Friday, small light cakes prepared for sale by bakers and pastry-cooks, having on them the figure of the cross in commemoration of Christ's death. TOO HOT FOR HIM, the surroundings made so disagreeable and intolerable as to necessitate a departure or retreat. IN HOT HASTE, in violent or unusual haste.—SYN. of 'hot': warm; burning; glowing; eager; ardent; keen; scorching; fervid; brisk; animated; precipitate; vehement; exciting; exasperated; lewd; lecherous; acrid; stimulating; pungent; dangerous.

HOT-AIR ENGINE: see CALORIC ENGINE.

HOT'BED: heap of fermenting matter, covered with a layer of earth, and generally surmounted with a frame, for cultivation of plants which require more than the natural heat of the climate and season, but not so much as to render the hothouse necessary. The heat is the result of fermentation. Hotbeds not being expensive, are in general use; as for growing melons, and for raising ornamental plants from seed in spring, to be planted in the open ground as summer advances, etc. The material mostly used is stable-dung, or a mixture of horse-dung and litter; but tanners' bark, leaves, the waste of flax, cotton, or woolen factories, etc., are sometimes substituted for it. The heat of a very rapid fermentation being too great, it is necessary that this be over before the hotbed is planted; and it is usual, on this account, to prepare the materials some time before it is formed. A hotbed is made highest at the back, sloping—in the northern parts of the world—toward the south. The bed extends on all sides six inches or thereby beyond the frame, which has a movable glass sash or sashes, according to its size. The thickness of the hotbed, and of the earth upon it, are accommodated to the purpose intended, and the degree of heat required. When the heat decreases, it is for some purposes necessary to keep it up by *linings* of the same material as the hot-bed, added to the sides of it. The sashes of hotbeds must be partially removed during the day, to permit ventilation and the escape of vapor.

HOTCHKISS, *hŏch'kĭs*, BENJAMIN BERKELY: 1830–1885, Feb. 14; b. Conn.: inventor. He learned the machinist's trade, invented his first rifle field-gun 1856, designed an improved system of rifling-belt and percussion fuse for projectiles, and manufactured them and the shell bearing his name for the U. S. govt. through the civil war; invented and sold to the French govt. an improved metallic cartridge case 1867, designed the revolving cannon, the magazine-rifle 1875, and the quick-firing gun since adopted by France, England, and the United States 1882, and in the latter year organized a company for manufacturing his guns and rifles in the countries using them.

HOTCH'POT: term in English law to denote that where one child has already received an advancement out of the father's personal estate, that child must bring such sum into hotchpot before he will be allowed to share with the other children, under the statute of distributions, after the father's death. See COLLATION.

HOTCH-POTCH, or -POT, n. *hŏch'pŏch* or *-pŏt* [F. *hochepot*—from *hocher*, to shake, to wag: see HODGE-PODGE, but HOTCH-POT is the older spelling]: a mingled mass; a mixture of ingredients; a farrago; hodge-podge. The Scottish dish H.-P. may be defined as a kind of mutton-broth in which green peas take the place of barley or rice. It can be had in perfection only when green peas are in season. Put on two quarts of water, and when it boils, put in three pounds of the back-ribs of mutton or lamb, paring off the fat if there be too much. Put in with the meat two or three carrots cut in squares, and two grated, also three or four sweet young turnips in squares, a cauliflower and a lettuce cut down, a few young onions shred, a little parsley, and about a pint of sweet young peas. Boil this for an hour and a half, then take out the meat, and cut it in chops, laying it aside. Add another pint of young peas, seasoning with pepper and salt; and when these peas are done, put in the chops. In a few minutes afterward, serve up the whole in a tureen. Instead of cutting the meat into chops, it is not unusual to keep it whole, and serve it separately. Neck of mutton makes excellent H.-P. The composition of the mess may be varied by the addition of beans, white cabbage sliced, or asparagus points. Some boil the empty hulls of the peas in a little water apart, and add the strained liquor to the rest, which gives additional sweetness. H.-P. is considered the *chefd'œuvre* of Scottish cookery.

HOT-COCKLES, n. *hŏt-kŏk'lz* [F. *hautes coquilles*]: child's game in which one covers his eyes and guesses who strikes him.

HOTEL, n. *hō'tĕl'* [OF. *hostel;* F. *hôtel*, a mansion (see HOST 1 and HOSTLER: a corruption of *hospital*]: a superior house for entertaining strangers or travellers; an inn; in *France*, a palace; a town mansion—in like manner Inn was anciently used in England to denote the town mansion of a great man. **HÔTEL DE VILLE**, *ō-tĕl' dĕ vēl'* [F. hotel of the town]: in *France* and *Belgium*, the city-hall or town-house. **HÔTEL DIEU**, n. *-ō-tĕl' dŭ* [F. *hôtel*, and *Dieu*, God]: in *France*, a hospital.

HOTEL': large or superior inn, or house for temporary accommodation of travellers or of transient sojourners. The name hostelrie was applied by Chaucer to a public inn, and till a more recent period it was used similarly in Scotland. From its general use comes the designation hostler, which originally signified the keeper of the inn or hostel. Only in recent times has the significant old English word inn been eclipsed by the reintroduction of hostel, under the softened form of hotel.

An account of inns ancient and modern, under whatever designation, would form an interesting chapter in social history. The caravansarai (q.v.) of the east is the most ancient species of inn of which there is any notice. The Greeks and Romans did not improve on the quality of these oriental establishments. Their inns, if worthy of the name, were little better than receptacles for humble classes of wayfarers, or places where cooked food and wine were dispensed to the hungry and thirsty stranger. Along their highways, the Romans gave encouragement to these primitive inns; the best of such establishments being called *caupona*, or *taberna diversoria*, while those of an inferior kind were known as *popinæ*, of which some specimens have been disclosed at Pompeii.

The duties of hospitality and the obligations of religion long postponed the introduction of regular inns. In mediæval times, the castles of the barons offered shelter with straw, and sometimes food, to the wayfarer of high and low degree, and there are traditions to the effect that to pass some of these strongholds without calling to render obeisance, and receive the hospitality of the owner, was deemed an insult. But the monastic establishments, great and small, scattered over every part of Christendom, formed the chief *hospitia* (see HOSPICE). With the general improvement of society and the increasing concourse of travellers came the modern inn, or professional hospitium, at which entertainment for man and horse was afforded as a matter of business. Nowhere in Europe did this class of establishments so soon attain to a determinate and respectable character as in England. Growing into importance first in London, York, Oxford, Bristol, and some other cities, the substantial and well-managed English inn was imitated on a smaller scale in the different provincial towns, and gained a good standing in national usage before it spread to Scotland; the inns of which, even till the middle of the 18th c., were on a meagre scale of accommodation. Of the many interesting old inns in London, all celebrated less or more from their respective signs, the following are well known:

the *Angel* at St. Clement Danes, and *Angel* at Islington; the *Bell,* Warwick Lane, Newgate Street; *Belle Savage,* Ludgate Hill; *Bull and Mouth,* St. Martin's-le-Grand; *Four Swans,* Bishopsgate Street; *Saracen's Head,* Snow Hill; *Golden Cross,* Charing Cross; *White Horse,* Fetter Lane; and *Tabard,* Southwark. All of these have either disappeared, or have been changed in character. For the most part, the old inns of London, Westminster, and Southwark; consisted of a building round a court yard, entered from the street by a wide covered passage. The ground-floor was disposed as stables, kitchens, and other offices, with a large reception-room; above, were the lesser apartments and bedrooms, these last all opening on hanging wooden galleries, whence the inmates could look down on the busy scene of arrivals and departures in the court-yard beneath. Some specimens of these old inns with open galleries remain. Such was the *Tabard,* renowned as the hostelrie from which Chaucer's pilgrims set out for Canterbury. There is reason to believe that this form of construction was derived from the arrangement of ancient Roman villas, which consisted of buildings round a series of court-yards; hence, also, the form of French hotels, public and private. Modern Italy has examples of inns of this form, e.g., the *Hôtel de Ville* at Milan, and the *Albergo delle Due Torri* at Verona; this last having hanging galleries round a court-yard in precisely the old English style.

Of the character and management of the inns of England, with their offers of 'entertainment to man and horse,' we are favored with innumerable glimpses in the fictions of Fielding, Smollett, Goldsmith, and others—the jolly hostess, the obsequious waiters, the bouncing chambermaids, the hostler who takes the traveller's nag, and above all the garrulous host who, when invited, gives his company to his guests, tells them the news, and at dinner, according to use and wont, places the first dish on the table. See *Dr. Syntax's Tour in Search of the Picturesque,* illustrated by Rowlandson, for some humorous delineations of inn-usages. The great personal comfort and independence of feeling enjoyed in English inns is frequently referred to in literature. Abp. Leighton, who died 1684, in the *Bell,* Warwick Lane, 'often used to say, that if he were to choose a place to die in, it should be an inn; it looking like a pilgrim's home, to whom this world was all as an inn, and who was weary of the noise and confusion of it. And he obtained what he desired.'—Burnet's *Own Times.* Dr. Samuel Johnson, as is well known, expatiates on the delights of an English inn; on one occasion, as related by Boswell, repeating with great emotion Shenstone's lines:

> 'Whoe'er has travelled life's dull round,
> Where'er his stages may have been,
> May sigh to think he still has found,
> The warmest welcome at an inn.'

English inns have not lost their reputation for comfort and the attention paid to guests; but the almost entire alteration in the methods of travelling by the introduction of railways has left them considerably behind the requirements of the age. Except in the smaller towns and villages, they have been superseded by hotels—that is, houses of a more pretentious kind. The better classes of these hotels contain private parlors for families or individuals who choose to be alone, also a large apartment for travellers generally. Houses frequented by commercial travellers have a room set apart for this class of customers. The plan of taking meals at a *table-d'hôte* has not hitherto made much progress in England, as if it were somehow contrary to national reserve and exclusiveness. The marked defect in the modern hotels in London and elsewhere in England is their insufficient size. The greater number are merely private houses transformed for the purpose, and are inadequate to meet the swollen dimensions of railway traffic. The truth is, the establishment of inns or hotels in any part of Great Britain has not hitherto been looked to as a profitable investment for a large capital. The business of innkeeping has been thought a little derogatory, and few except old waiters, who had realized some money by their services, embarked in the business. On the continent of Europe, the trade of hotel-keeping has considerably higher social status. A large capital is invested, the keeper or manager is a man of local note, and the waiters or *garçons* are young men who follow the business as a profession in which they expect to rise by their diligence and acquirements. In fact, the *garçon* is much above the English waiter in his aims. He voluntarily undergoes a kind of curriculum of education, by passing from the hotels of one country to those of another, and does not consider himself proficient till he speaks German, French, Italian, and English; and at the very least, if of German birth, speaking French with fluency. Some good and capacious hotels, built distinctly as such, have lately been established at the principal railway termini in London, also at Dover and a few other places. With these exceptions, most English hotels are far behind the high-class hotels of the continent; such as the *Grand Hôtel* and the *Hôtel de Louvre* at Paris, and the *Métropole* at Geneva. In London, an enormous and excellent *Grand Hotel* was opened in Trafalgar Square 1880. The *Euston*, the *Victoria*, the *Grosvenor*, the *Paddington*, the *Charing Cross*, the *Midland* (all connected with railway termini); the *Alexandra*, the *Palace*, the *Inns of Court*, and the *Langham* are exceedingly well-appointed hotels.

In England, the hotel system of living is simply that of paying for what is called for, with the addition of a certain charge per diem for the rooms occupied; in France and other continental countries, this plan is modified by the plan of dining at a table d'hôte, which lessens the general expenses. Both in English, and continental hotels, the charge for attendance is now made explicity in the bill, a very grateful improvement. The ordinary hotels in all parts of the United Kingdom are licensed by magistrates to sell wines, spirits, and other excisable liquors, and therefore come under the category of public-houses.

open to the supervision of the police. In the higher-class hotels, however, the supply of liquors is confined to the resident guests; and it is only in the others that drink is sold as in taverns: see TAVERN. Latterly, there has sprung up a class of houses, some of them on a considerable scale, known as *Temperance Hotels*, which have no license, and do not supply any excisable liquors: see TEMPERANCE MOVEMENT.

Throughout the United States, the system of hotels has taken a peculiar turn. The hotels are built for the purpose, and usually very large; with few exceptions they are conducted as boarding-houses on the plan of charging so much per diem, everything included excepting liquor, which is obtainable in a large drinking-room called the bar. A common charge is about $4.00 a day. All the meals are given with liberal profusion in the table-d'hôte fashion; and as absence from these entertainments—to dine with a friend, for example—makes no difference of charge, the system, though simple and adapted to a constant flow of customers, is not without its disadvantages. Elegant, spacious, and commodious, the American hotels are on a scale of great expense; the larger ones will accommodate 1,000 guests. Some of these establishments are startling in their splendor and magnificence. A hotel on the American plan, with 1,000 beds, was built in Holborn, London, 1883. The system of American hotels is generally followed in the British colonies.

For laws respecting hotels, see INN—INNKEEPER.

HOTHOUSE: a structure in which exotic plants are grown by the aid of artificial heat. In a loose way, the term is applied to the various buildings in which a high temperature is maintained during the cold season, as the greenhouse (q.v.), conservatory, stove, etc., but is more properly restricted to those in which heat is supplied during the entire year. The H. is more frequently provided as a luxury, while the greenhouse is often made a source of profit by supplying the means for forcing vegetables for the early market. The sides, as well as the roof, of the H. are largely composed of glass. Heat is furnished by flues or by means of steam, or hot water, conducted by pipes throughout the building. Either of the latter methods, though more expensive, usually gives better satisfaction than flues. The proper management of the H. requires constant care and a high degree of skill. Not only must the temperature be regulated day and night, but the right degree of moisture of soil and air must be secured, the light must be modified to suit the wants of the plants, and ventilation must be given with the greatest care. Unceasing watchfulness will also be needed to prevent injury by insects, and to guard against the fungoid diseases to which plants grown in an artificially hot and moist climate are peculiarly susceptible.

HOT SPRINGS: small town in Arkansas, 45 m. w. by s. of Little Rock; celebrated as a resort for invalids to the hot springs which give the name to the village and the county. Fifty-seven springs, temperature 93° to 150° F., break out from the w. side of a mountain, and flow into a creek, which empties into the Wachita river, six m. distant. There are also cold chalybeato springs, much frequented, and sulphur springs, in the same county. Pop. about 2,000.

HOTTENTOT, n. *hot ĕn-tŏt'* [probably from the click of the language of the s. African tribes—*hot en-tot*]: a native of s. Africa; a bushman or Bosjesman; thence, *fig.* a savage or brutal man. It is the name given by Europeans to a singular race of people, supposed to be descended from the aborigines of s. Africa, and now dwelling for the most part in and about the English settlement of the Cape of Good Hope. The origin of the name H. is uncertain. Some think it is a word coined by the early Dutch settlers to convey some idea of the peculiar clicking noise made by the people when speaking. Dampier, however, wrote the name *Hodmadod*, instead of H.: and Prichard says that it is probably a corruption of *Houteniqua*, the name of a particular tribe now extinct, or at least unknown. They now call themselves by various names, supposed to be those of tribes, as Attaquas, Hessaquas, Dammaras, Saabs or Saaps, Namaquas, and Koranas; and by the collective name of Gkhuigkhui or Khoikhoin ('men,' to distinguish themselves from Bushmen).

Ethnologically, the Hottentots form a distant group of races, unconnected with the Bantu tribes (Kaffirs, etc.), who are their neighbors, and probably not allied with the Bushmen. Latham put them in his second great division of the human family—Atlantidæ. By Blumenbach, they were ranged under his third division race—the *Ethiopians*. But the H. are not like the negroes, and are more akin to the Mongolians; having broad foreheads, high cheek-bones, oblique eyes, and a dirty, olive-colored complexion. The width of the orbits, their distance from each other, the large size of the occipital foramen, are points in which the H. resemble the n. Asiatics, and even the Esquimaux. The person of the H., when young, is remarkable for symmetry. The joints and extremities are small, and the males look almost as effeminate as the women. The face, however, is in general extremely ugly, and with age this ugliness increases. Sir John Barrow, in describing H. women, observes of them that before child-bearing they are models of proportion, every joint and limb rounded and well turned, their hands and feet small and delicate, and their gait not deficient in grace. 'Their charms, however, are very fleeting. At an early period of life, and immediately after the first child, their breasts begin to grow loose and flaccid, and as old age approaches, become distended to an enormous size; the belly protrudes; and the hinder parts swelling out to incredible dimensions, give to the spine a degree of curvature inwards that makes it appear as if the *os coccygis*, or bone at the lower extremity of the spine, was elongated and bent outwards, which is not the case.' The appearance of the Bosjesmen or Bushmen (q.v.), who may be a degraded branch of the Hottentots, is still more unattractive.

The language of the Hottentots is quite as singular as their personal appearance. It has been called 'the click language,' and has also been compared to the clucking of a hen when she has laid an egg. The dress of the H. in his native state is exceedingly simple, being merely a strip of the skin of some animal tied round the waist, from which there depends a sort of apron both before and behind. This is nearly the same for both sexes, so that in the summer both go almost naked, protecting their persons from the sun by a covering of grease; but in the winter they have a sort of cloak made with skins, that covers nearly the whole body. The Hottentots live in kraals or villages, consisting of a number of circular huts like bee-hives. They have oxen and sheep, in the management of which they show great skill. They are addicted to the chase, in which they use poisoned arrows, javelins, and spears. Their only manufacture is a rude kind of earthenware; except, of course, that they make their own sheep-skin clothes, such as they are; also their bows and arrows, and other weapons. Like most savages, they have some taste for music, which they practice upon a rude sort of guitar with three strings, and a flute made of the bark of trees. Of religion, there appears very little notion among the H., and they have no particular observances at either births, marriages, or funerals. Dr. Prichard, however, observes of them: 'Although the wild tribes of the H. race display ferocity and all the other vices of savage life, yet we have abundant proof that these people are not insusceptible of the blessings of civilization and Christianity. No uncultivated people appear to have received the instruction of the Moravian missionaries more readily than the Hottentots, or to have been more fully reclaimed and Christianized.'

The Hottentots, as a distinct race, became known to Europeans first about 1509, when Francisco d'Almeyda, Viceroy of India, landing at Table Bay, was killed with about 70 of his followers, in a scuffle with the natives. They were afterward frequently visited by navigators from different countries; but no authentic account reached Europe respecting them until the Dutch settled in the Cape of Good Hope in the middle of the 17th c. They were then much more numerous than at present, but becoming addicted to rum and brandy, their numbers diminished gradually. Many of the tribes parted with their flocks and herds to procure the fire-water, and eventually they became the absolute slaves of the Dutch settlers or Boers. From this condition they have been delivered by the enlightened and humane policy of the British government; and as free laborers they make excellent herdsmen and drovers. Their number at present is thought to amount to 15,000 to 20,000, not including those who probably dwell more in the interior. Of the Bushmen, no numerical estimate has been formed. They are widely scattered throughout the English settlements but their numbers must be very small, while their wretched and degraded habits are such that it is thought they will soon become utterly extinct.

HOT'TENTOT COUN'TRY: region of s. Africa, stretching indefinitely to the n. from the Cape Colony, having the Atlantic on the w., and the Bechuanas and Kafirs on the e. In e. long. it extends between 15° and 27°; and in s. lat. between 31 and some line n. of the tropic of Capricorn. This territory is of little value. Its principal river, the Orange, is almost useless for navigation; and though the surface here and there is well wooded, yet it is chiefly an arid desert. The only examples of civilization are to be found in several missionary establishments.

HOT'TENTOTS' BREAD: yam plant of the system *Testudinaria elephantipes*, order *Dioscoreaceæ*, indigenous to the Cape of Good Hope region of s. Africa. It was formerly supposed that its tubers or rootstock formed part of the Hottentots' daily food, but it is now believed that animals only eat them. These roots grow half in and half above the ground, and send out pretty branches bearing green heart-shaped leaves, which render the plant popular as a climber under cultivation. The rootstock is frequently 3 ft. in diameter, and its surface somewhat resembles the shell of a large tortoise. From this earth-brown and apparently dead stock stems have been known to climb to a height of 20–40 ft. in a few weeks. It differs in habit materially from the yam, but is very similar to it in flower and fruit.

Water Violet (*Hottonia Palustris*): *a*, corolla; *b*, calyx; *c*, pistil; *d*, stamen.

HOTTONIA, *hŏt-to'ni-a:* genus of plants of nat. ord.

Primulaceæ, of which one species, *H. palustris*, Water Violet or Featherfoil, is a beautiful aquatic plant. Its leaves all are submerged, crowded, and much divided; the large, beautiful, pale purple, whorled flowers alone rise above water on a long cylindrical stalk. Other species of H. are found in the East.

HOT WALLS, or **FLUED WALLS**, in Gardening: walls furnished with furnaces and flues, in order to the production of finer kinds of fruit than could otherwise be expected in the climate. The flues are led as obliquely, and make as many turns from right to left as are consistent with their drawing well, so that as little heat as possible may escape by the chimney, and as much as possible may be expended on the wall. The heat is applied chiefly during spring. At that season, also, movable glazed frames, or sometimes mere screens, are placed in front of the walls.

HOUA'RIOS: small coasting vessels and pleasure-boats used in parts of the Mediterranean. They bear lateen sails, and have each two masts and a bowsprit.

HOUDAH: see HOWDAH.

HOUDIE: see HOWDY.

HOUDIN, *ô-dăng'*, ROBERT: 1805, Dec. 6—1871, June; b. Blois, France: conjuror. He received a collegiate education, learned the watch-making trade; and for several years was engaged in Paris making mechanical toys and automata, for which he obtained a medal at the Paris exhibition 1844. In the following year he began his career as a conjuror, performing many wonderful feats by means of mechanical aids of his own invention. He made a practical application of electricity to clocks, for which he received the gold medal of the exhibition 1855; and having sold his *soirées fantastiques* to his brother-in-law, he retired from public life. But 1856 he was sent to Algeria by the French govt., and succeeded in measureably breaking the influence of the marabouts over the Arabs by outdoing the pretended miracles of those priests. He published *Robert Houdin, sa vie, ses œuvres, son théatre* (1857), *Confidences* (1859), and *Les tricheries des Grecs dévoilés* (1861).

HOUDON, *ô-dōng'*, JEAN ANTOINE: 1741, Mar. 20—1828, July 15; b. Versailles, France: sculptor. He studied art with Slodtz, Pigale, and in the school of fine arts, where he took the first prize for sculpture 1760, which gave him 10 years' residence and study in Rome. While in Rome he executed a colossal St. Bruno, and on his return to Paris statues of Voltaire, Cicero, and Tourville, and busts of Napoleon, Josephine, Ney, Rousseau, Barthelémy, Mirabeau Franklin, and other eminent people of the day. He was elected a member of the French Acad, came to the United States with Franklin 1785, and after being a guest of Washington at Mt. Vernon executed the statue of him for the state of Va. now in the capitol at Richmond.

HOUFF, n. *howf* [AS. *hóf*, a house: Icel. *hof*, the fore-court or hall: Ger. *hof*, a yard or court]: in *Scot.*, a hall; a place of resort; a haunt; a place of concealment.

HOUGH, n. *hŏk* [Ger. *hacke*, the heel; ***hacken***, to dig: Icel. *há*, as in *hásinn*, a hock-sinew: Dut. *hak*, the heel (see HOCK)]: the lower part of the thigh; the ham; the joint of the hind-leg of a beast: V. to disable by cutting the sinews of the ham. HOUGH'ING, imp. HOUGHED, pp. *hŏkt.*

HOUGHTON, *hō'ton:* town, cap. of H. co., Mich.: on Lake Portage, 10 m. from Lake Superior, 28 m. n. of L'Anse, 70 m. n.w. of Marquette. It is the centre of the vast Lake Superior copper mining region, the H. co. mines now producing 95 per cent. of all the copper mined in the region; is connected with Lake Superior via Lake Portage by a ship canal and with the former lake ports by large steamboats; has 3 churches, 1 national bank (cap. $150,000), graded school, hotel, and newspaper; and contains rich copper mines, copper rolling mill, smelting furnaces, manufactories of copper and iron, and 2 steam saw mills. The co. and cap were named after Dr. Douglass H., who discovered pure copper in the present Ontonagon co. 1830, and gold in Baraga co. 1845. Pop. (1884) 1,565.

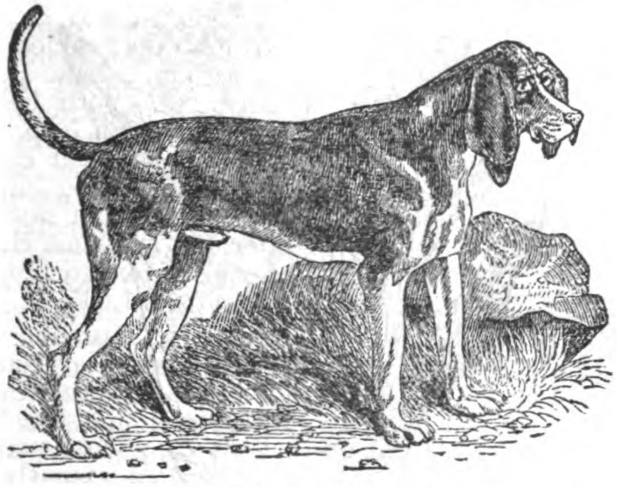
HOUGHTON (RICHARD MONCKTON MILNES), Lord: 1809, June 19—1885, Aug. 11; b. Yorkshire, England: author and statesman. He graduated at Trinity College, Cambridge, 1831, was member of parliament for Pontefract as conservative and liberal 1837–63, and was raised to the peerage 1863, Aug. 20. He travelled extensively in early life, promoted popular education, religious equality, and criminal reformation while in parliament, and entertained the most cultured people of Europe and America at his grand estate, Fryston Hall. Beside many political pamphlets and speeches he published *Memorials of a Tour in Greece* (1833); *Memorials of a Residence on the Continent, and Historical Poems, and Poetical Works* (1838); *Poetry for the People, and Other Poems* (1840); *Palm Leaves, Eastern Poems, Poems Legendary and Historical, and Poems of Many Years* (1844); *Good Night and Good Morning* (1859); *Monographs, Personal and Social* (1873); and *Poetical Works* (1874).

HOUGHTON-LE-SPRING, *hō'ton lĕ spring:* town of the county of Durham, England, nearly 7 m. n.e. from Durham, on the Great Northern Railway. The town has recently much increased, and owes its prosperity mainly to the numerous coal-mines of the neighborhood, the coal produced by which is excellent. The surrounding district is very populous, and contains numerous villages. Pop. of H. (1871) 5,276; (1881) 6,041.

HOULTON, *hōl'ton:* town, cap. of Aroostook co., Me.; on the New Brunswick and Canada railroad: 14 m. w. of Woodstock, N. B., 100 m. n.n.e. of Bangor. It is an important point in the lumber region; contains 6 churches, H. Acad., 1 national bank (cap. $50,000), 1 savings bank, 2 grist-mills, 2 carding-mills, 4 saw-mills, iron-foundry, machine-shop, woolen-mill, and 2 weekly newspapers; and does considerable business in potatoes, hay, starch, hemlock bark, and cedar-shingles. Pop. (1870) 2,850; (1880) 3,228; (1887) est. 4,000.

HOU'NAN: see HU-NAN.

HOUND, n. *hownd* [Ger. *hund;* Icel. *hundr;* Goth. *hunds;* Gr. *kuon*, a dog: O.H.G *hunon*, to growl as a fox: Esthon. *hundi*, a wolf]: one of a particular breed of dogs used in hunting, as a stag-hound, fox-hound, etc. By systematic writers on dogs, the name is given to those which hunt by scent rather than by sight. When this definition is adopted, greyhounds are not regarded as true hounds. Examples of true hounds are the bloodhound, old English southern hound, the staghound, the fox-hound, the harrier, and the beagle; closely allied to which are the pointer, setter, spaniel, etc. (See these titles.) The hounds are by some naturalists regarded as a distinct species of dog (*Canis sagax*): see DOG. They are characterized not only by fineness of scent, but by great docility and sagacity. The muzzle is not so sharp as in greyhounds, nor is the form so slender. The ears are large and pendulous. Some varieties have rough, and some have smooth hair. The rough-haired varieties are generally those which show the most perfect domestication, and in which the attachment to man is closest. True hounds are figured in ancient Egyptian paintings and sculptures. It is believed that all the best varieties were introduced into Europe in comparatively recent times from the East. HOUND, v. to set on; to chase. HOUND'ING, imp. HOUND'ED, pp. HOUNDFISH, a kind of shark (q.v.). HOUNDS, n. plu. *howndz*, particular projecting parts of a mast-head. TO FOLLOW THE HOUNDS, to be in the habit of hunting. TO HOUND A PERSON, to harass, to annoy a person with the aid of others, as hounds let slip at game in hunting; to persecute unceasingly.



Old English Hound (*Canis sagax*).

HOUNDS, in English Law: recognized as of use in fox-hunting, as in a sort of privileged pursuit; so that one following the hounds on a stranger's lands, is not liable to an action of law for the trespass. But no more damage is to be done than is absolutely necessary.

HOUND'S-TOUGUE (*Cynoglossum*): genus of plants of nat. ord. *Boragineæ*, of which there are many species, all of coarse appearance, with small flowers. The COMMON H. (*C. officinale*) is a native of Europe, Asia, Africa, and America. It has soft downy leaves, of dull-green color, purplish-red flowers, and a stem about two ft. high. Its odor is very disagreeable. The root was formerly administered in scrofula, dysentery, etc., and is said to be anodyne. It is also one of the pretended specifics for serpent-bites and hydrophobia.

Hound's-Tongue (*Cynoglossum officinale*).

HOUNSLOW, *hownz'lō:* small town of England, county of Middlesex, consisting of a single street, stretching along the Great Western road from London, from which it is ten m. west. Its church, a modern building in the Italian style, is surmounted by 12 small spires and a belfry. The numerous inns and posting-houses of H. were busy and prosperous till the opening of the railways to Southampton and Bath. Previous to that event, its posting business was as extensive as that of almost any town in England. About 800 horses were then maintained here, and about 183 coaches, while 500 coaches passed through the village daily. The Heath, formerly notorious as the scene of highway robberies, is now in great part inclosed. Numerous villas have risen around the town. On the Heath are extensive gunpowder mills, cavalry barracks, and an arsenal. Pop. (1871) 9,294.

HOUR, n, *ŏwr* [L. and Gr. *hora*, an hour: F. *heure;* OF. *hore;* Gael. *uair*, time, season: W. *awr*, an hour]: a period of time marked by a clock or watch; 60 minutes; 24th part of a day; a particular time as marked by a watch or clock. The division of the day into hours seems to have been known to the Babylonians and Egyptians, from whom, first the Greeks, and then the Romans derived it. But their scheme of division extended only to the natural day (while the sun was above the horizon), which they divided into 12 parts. The consequence was that the hour constantly varied in length. This system was introduced into Rome by L. Papirius Cursor about B. C. 293, and during the Punic Wars, the Romans adopted the division of the night also into 12 parts. This system continued till about the end of the 4th c., when the present system was adopted. In the British Empire, and most European countries, as in the United States, the day is reckoned from midnight to midday 12 hours, and midday to midnight 12 hours. See HOROLOGY. In Italy, the day is reckoned from sunset to sunset, and the hours are counted from 1 to 24. The Chinese reckon from an hour (in our time) before midnight till the corresponding time next night, 12 hours, each hour being equal to two of ours. The Japanese still follow the old custom of reckoning from sunrise till sunset. Astronomers reckon from midday (on the previous day) to midday, counting from 1 to 24. HOUR'LY, a. *-lĭ*, done every hour; frequent; continual: AD. every hour. HOUR-GLASS, an instr. for measuring time, particularly an hour, consisting of two glass bulbs connected by a narrow tube, the one containing fine dried sand or a liquid sufficient in quantity to run out in an hour exactly. HOUR-HAND, one of the hands of a clock pointing to the hours. TO KEEP GOOD HOURS, to be at home in good season; to attend closely to one's religious duties. HOURS, certain prayers in Rom. Cath. Church. CANONICAL HOURS, the particular times of certain days appointed by ecclesiastical authority for public worship; also applied to stated times appointed for certain private devotions—see under CANON. HOUR-CIRCLES, the 24 circles drawn from n. to s. on the terrestrial globe, and terminating at both poles.

HOURA, *hô'ra:* town on the right or w. bank of the Hooghly, within the limits of the Twenty-four Pergunnahs; lat. 22° 36′ n., and long, 88° 23′ e. It is directly opposite to Calcutta, of which it may be regarded as a suburb. The river between them is their common harbor; and H., is inhabited chiefly by ship-builders. The great railway takes its departure from H. for the N.W. Provinces.

HOUR-'GLASS: instrument for measuring intervals of time. It is of glass, and consists of two bulbs united by a narrow neck; one of the bulbs is nearly filled with dry sand, fine enough to run freely through the orifice in the neck, and the quantity of sand is just as much as can run through the orifice in an hour, if the instrument is to be an hour-glass; in a minute, if a minute-glass, etc. The obvious defects of this instrument are the expansion of contraction of the orifice produced by heat or cold, and the variations in the dryness of the sand, all of which produce deviations from the true measurement of the time. Sometimes water has been used instead of sand. The H.G.

was almost universally employed in churches during the 16th and the 17th c. In several churches in England, H.G. stands of elegant workmanship are still seen.

HOURI, n. *how'rĭ* [Ar. *huri*, a virgin of Paradise—from *hur al oyun*, black-eyed]: among *Mohammedans*, a nymph of Paradise. Houris, n. plu. *how'rĭz*. These beautiful beings are represented in the Koran as formed of musk, dwelling in pavilions of pearl. To each faithful Mohammedan, 72 of them are assigned, beside the wives who belonged to him on earth.

HOUSATONIC, *hô-sa-tŏn'ĭk*, River: rising in Mass., flowing southwardly through Connecticut into Long Island Sound. Its length is about 150 m., through a picturesque country, and its numerous falls afford water-power to many manufacturing villages. For 40 m. its course is followed by the Housatonic railroad.

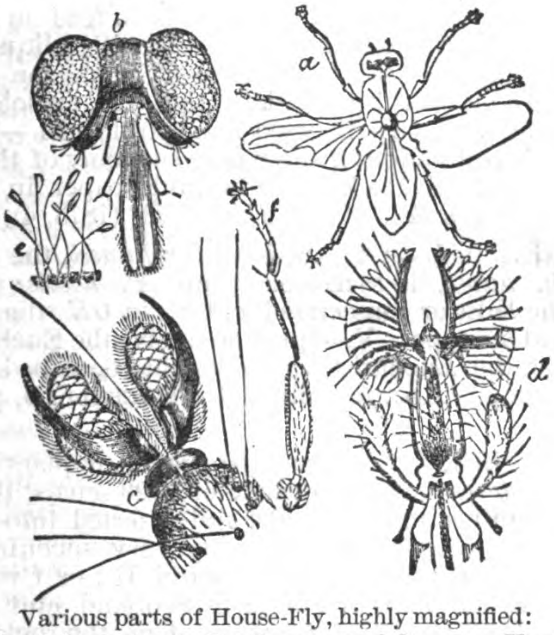
HOUSE, n. *hows*, Houses, n. plu. *howz'ĕz* [Goth. *hus;* Dut. *huis;* Icel. *hús;* Ger. *haus;* Hung. *haz*, a house]: any building for habitation or shelter; domestic concerns; manner of living; a family of ancestors or kindred; a trading firm; estates of a kingdom assembled in parliament, as House of Lords, House of Commons; the body, as, 'house of this tabernacle;' the grave, as 'house appointed for all living;' an astrological division of the heavens: V. *howz*, to shelter; to take shelter; to put under cover. Hous'ing, imp.: N. the number of habitable buildings: see Housing. Housed, pp. *howzd*. Houseless, a. *hows'lĕs*, destitute of a home. Housebote, in *English law*, right of a tenant to cut wood on the land to repair the house (see Estover). Housebreaker, n. one who enters a house by force to rob it (see House, in Law). Houseburning, name in *Scotch law* for Arson. House-decorator, a tradesman who undertakes the painting and paper-hanging of houses. House-dog, a watch-dog. House-doves, doves kept in dove-cotes near a house; in the *law of England*, they are protected like domestic animals. House-factor, in *Scot.*, an agent for the sale or letting of houses. House of God, a temple or church. Household, n. a family living together: Adj. of the house or family; domestic. The Household, or Royal Household, in *Great Britain*, domestic establishment of the sovereign. Households, n. plu. *-hōldz*, among *millers*, a certain quality of wheaten flour. Household stuff, the furniture, etc., of a house. House'holder, n. one who occupies or owns a house. Household gods, all those minor articles and domestic pets that so much endear to us our homes; for household gods among the anc. Romans, see Lares, Manes, and Penates. Household suffrage, in *English law*, the right to vote, as restricted to householders. Male citizens of proper age, having occupied a distinct dwelling or part of a dwelling 12 months, and having paid their assessed rates, are entitled to vote: also lodgers, occupying continuously for 12 months and paying a rental above a certain amount. House-joiner, a carpenter who does work for the interior of houses. House'keeper, n. one who has the chief care of a house or family. **House'keeping**, n. domestic concerns and management. **Houseline**, n., or **Hous'ing**, n. among *seamen*, a small line of three strands. **Housemaid**, n. a female servant who attends table, and has the care of the rooms, furniture, etc. **House of call**, among *tradesmen*, a house where journeymen of a particular trade assemble when out of work, and where they can be hired by masters. **House-rents**: see **Landlord and Tenant**. **House-room**, lodging in a house; free space. **House-steward**, a superior domestic who manages a large household. **House-warming**, n. *-wawrm-ĭng*, a familiar name for an entertainment on the occasion of taking possession of a new house or new premises, generally for business purposes. **Housewife**, n. *hows'wīf*, the mistress of a house who is a good manager. **Housewife**, n. *hŭz'ĭf*, a little case for needles, etc. **House'wifery**, n. *-wīf-ėr-ĭ*, female management of domestic concerns. **Open house**, hospitality to all comers **Religious house**, a monastery or convent. **To bring down the whole house**, to draw an outburst of applause from the entire audience, as in a theatre. **To make a house**, in *parliament*, to get a quorum of members. **House of Commons**, lower branch of the British legislature, or Lower House, whose members consist of representatives from towns and counties (see **Parliament**). **House of Lords**, upper branch of the British legislature, whose members consist of princes of the blood, peers of the realm, and certain bishops of the church (see **Parliament**). **Eaten out of house and home**, deprived of all ordinary means of existence; resources will not be equal to the demands made on them. **Household troops**, in *Britain*, the troops whose appointed duties are to attend the sovereign, and guard the metropolis, consisting of 1st and 2d Life Guards, the Royal Horse Guards, and Foot Guards of three regiments—viz., the Grenadier, Coldstream, and Scots Guards: these troops number in all ranks 1,302 cavalry and 5,950 infantry—the flower of the British army.—Syn. of 'house': tenement; dwelling; family; household; lineage; race; ancestors; descendants; kindred; tribe; a firm; a company; residence; building; edifice; mansion; abode; an inn; hotel; monastery; college; theatre.

HOUSE, in Law: said to be 'an Englishman's castle,' though not a Scotchman's. In other words, when a man shuts himself up in his own house, no bailiff can break open the door to arrest him, or seize his goods for debt in England or Ireland, and no court can give a bailiff such power; in Scotland, however, even a man's own house is no protection, for leave can be got from the court, often called on that account the queen's keys, which enables the messenger to break open the outer-door and arrest. In England, therefore, if a person can manage to procure supplies from without, he can fortify himself against the enemy for any length of time; but though it is not competent for the bailiff to break open the outer-door by force, yet every trick or stratagem is fair in order to effect a peaceable entry, and once in, he cannot be turned out.

Where the party is charged with a criminal offense, a constable armed with a warrant, or in some cases without, is entitled to break into the house and arrest him. A man is entitled also to defend his house against trespasses and thieves, using no greater force than is necessary; and if necessary in that sense, he may even kill the intruder, though very strong circumstances are required to justify this. All offenses committed in a house are generally punished more severely. (See HAIMSUCKEN, in Scotch law). *Housebreaking* is a technical name in Scotland, but in England is a popular phrase, the legal terms being larceny or robbery in a dwelling-house, or burglary, according to the circumstances.—The law in the United States is the same as in England, with one or two variations in a few states. In a criminal case, an officer with a warrant can make forcible entry.

HOUSE, APART'MENT; or FLAT: domicile so constructed that each floor provides accommodations for a single family. The evolution of this kind of habitation in large American cities, particularly in New York, exhibits curious features of social life. The idea originally contemplated a convenience to people of moderate means, those who could afford to pay a little more than common tenement house rent, but not sufficient for half-houses or whole ones in better neighborhoods. The necessity for improved dwellings for what is called the working-class was demonstrated by the Metropolitan Board of Health, and stimulated by the efforts of George Peabody, the Baroness Burdett-Coutts, and Lord-Mayor Waterlow in London; Sir Titus Salt in Yorkshire, England; the Krupp brothers in Essen, Prussia; Schneider in Creuzot, France; and by the municipalities of Edinburgh and Glasgow. The first provision of the house-on-one-floor plan in New York was the French flat, which for several years failed of appreciation. In 1879 interest in the reform was renewed by favorable legislative action, the sympathy of prominent and wealthy citizens expressed in a notable mass-meeting Feb. 28, the agitation by building loan-associations, and the successful experiments of the Rev. John Cotton Smith, D.D., of the Church of the Ascension (Prot. Episc.). In the following year a member of 'model tenements' were built and speedily occupied. Capitalists then began venturing the erection of other and larger ones, over the construction of which both the board of health and the building dept. exercised a vigilance authorized by the legislature and the municipal ordinances. Thus thousands of stifled, over-crowded, filth-reeking, and desease-breeding tenements gave way to buildings in larger accord with sanitary science. These structures were still called 'tenements,' and were erected for working-people of small incomes. Their success led shrewd architects and capitalists to believe that buildings constructed on the same general principles but with larger accommodations and more provision for the comforts and elegancies of domestic life would become equally popular with those who could afford to pay a somewhat higher rent. Hence they began elaborating, putting in marble mantels, stationary ranges and tubs, elevators, ash shoots, plate-glass windows and sliding doors, beautiful frescoes, flooring of artistic tiles, and officious janitors. The result was that the one-floor apartment, planned for people in very moderate circumstances, soon developed into brown-stone, brick, granite, marble, and iron, 6, 8, and 10 story 'flats,' with single floors commanding a higher rental then entire 4 and 5 story buildings in good uptown neighborhoods. Wealth and fashion have conformed to the new idea, and the beautiful streets and avenues in the best parts of the city and around Central Park abound with enormous piles of masonry, bearing aristocratic names, costing $250,000 and upward each, possessing every convenience of luxurious domestic life, and renting from $40 to $500 per month per floor according to height from the ground. Some of the grandest and most expensive of these buildings have not yet reached financial success.

HOUSE′-FLY (***Musca domestica***): insect of the vast dipterous family ***Muscides***, remarkable for its extensive distribution in the old and in the new world. The maggots live in moist dung, in heaps of rotting vegetables, etc. The insect, annoying as it often is, is exceedingly useful by reason of the great amount of scavenger-work which it performs in and around human habitations. When house-flies become annoying, various expedients are resorted to for killing them, as trapping in glasses partially filled with some sweet viscid fluid, or by pieces of paper covered with



Various parts of House-Fly, highly magnified:

Copied from Samuelson's *Earthworm and Common House-Fly.*

a, section of fly, showing nervous system; *b*, head of house-fly, showing the compound eyes, and, beneath, the proboscis; *c*, last joint of tarsus, or foot of fly, with hooks and pads; *d*, proboscis of house-fly; *e*, portion of fringe of the pad, to show the supposed suckers; *f*, leg of fly.

a mixture of sweet and poisonous substances. Sweet substances, however, attract flies into a room, so that the benefit of fly-traps is often doubtful; and care must be taken that the poisons used do not endanger the lives of children and others. Quassia is safe enough in this respect, and very fatal to flies. Wire screens rising and falling like sash in windows, and hinged as doors, are now extensively used to exclude them from houses.

For the power which many insects possess of walking on perpendicular walls, ceilings, etc., see DIPTERA. Recent observations seem to show that though the membranous disks (*pulvilli*) on the foot of a fly are incapable of being used as suckers, yet the hairs with which they are thickly beset, are terminated by minute disks, which probably are so used. At the same time, these minute disks appear to exude a liquid, not viscid, which may serve to make the adhesion more perfect.

The proboscis of the H. is an interesting microscopic object. It is formed chiefly by an extraordinary development of the *tonguelet* or *ligula*, the upper part of the under lip (*labium*), but with this are combined lancets formed of the metamorphosed *maxillæ* (see COLEOPTERA). The lobes of the ligula are much enlarged and fleshy. They are surrounded by rough hairs, to aid in scraping or tearing delicate surfaces. There are many rows of these hairs on each lobe. In using its proboscis to feed on dry substances, as sugar, the fly moistens them with a liquid which may be regarded as saliva, so as to fit them for suctorial action. To aid in this suctorial action, the muscles of the lobes of the ligula are disposed in a spiral form.—The first thorough investigation of the whole economy of the house-fly, is in Dr. A. S. Packard's admirable paper in *Proceedings of the Boston Soc. of Nat. Hist.* XVI. (1873, 4), 136–150.

HOUSEL, n. *how'zĕl* [AS. *húsel* for *hunsel*, the Eucharist: Goth. *hunsl*, a sacrifice: comp. F. *hostie;* mid. L. *hostĭă*. the Host or consecrated wafer]: in *OE.*, the Eucharist or Lord's Supper: V. to give or receive the Eucharist; to administer the Eucharist to one on his deathbed. **HOU'SELLING**, imp.: **ADJ.** sacramental. **HOUSELLED**, pp. *how'zĕld*.

HOUSE-'LEEK (*Sempervivum*): genus of plants of nat. ord. *Crassulaceæ*, having a calyx of 6–20 sepals, the petals equal in number to the sepals, and inserted into the base of the calyx; the leaves generally very succulent, and forming close rosettes. The COMMON H., or CYPHEL (*S. tectorum*), called *Fous* or *Fouets* in Scotland, and in some countries *Jupiter's Beard*, grows wild on the rocks of the Alps, but has long been common in almost every part of Europe, planted on walls, roof of cottages, etc.; and has been introduced into America. It sends up leafy flowering stems 6–12 inches height, bearing branches of pale-red star-like flowers, equally curious and beautiful. The leaves cut or bruised, and applied to burns, afford immediate relief; as they do also in stings of bees or wasps; and they are a beneficial application to ulcers and inflamed sores. They were formerly in high esteem as a remedy for fevers and other diseases, and an edict of Charlemagne contributed greatly to the extensive distribution of the plant. The edict is in these words: *Et habeat quisque supra domum suum Jovis barbam* (And let everybody have the Jupiter's beard on his house).—Other species possess similar properties. *S. soboliferum*, with yellowish-green flowers, is frequently planted on walls in Germany. Some of the species, natives of s. Europe, Canary Isles, etc., are shrubby; others are common greenhouse plants.

House-Leek (*Sempervivum tectorum*).

HOUSE'MAID'S KNEE: term commonly applied to an acute inflammation of the bursa or sac that intervenes between the patella, or knee-pan, and the skin. Housemaids especially are liable to it from their kneeling on hard damp stones or floors in some household duties. It causes considerable pain, swelling, and febrile disturbance. The only disease for which it can be mistaken is acute inflammation of the synovial membrane lining the cavity of the joint; but in this disease, the patella is thrown forward, and the swelling is at the sides, while in housemaid's knee the swelling is very superficial, and is in front of the patella.—The treatment consists essentially in the means usually employed to combat inflammation; viz., rest, leeches, fomentations, and purgatives; if suppuration takes place, the sac must be freely opened, and the pus evacuated.

HOUSE OF CORREC'TION: jail, usually not under the ordinary charge of the sheriff, but governed by a keeper; in England it is sometimes called a Bridewell. These houses were originally intended for the detention of vagrants and convicted persons, and compelling these to work; but the distinction between jail and house of correction is abolished in England, and is no longer definite in the United States. In general, they are the same as penitentiaries, for criminals of a grade less than those who are sentenced to state-prisons. See Prisons.

HOUSING, n. *howz'ing* [F. *housse;* OF. *houce*, a short mantle worn about the head and shoulders in bad weather, a foot-cloth for a horse, a coverlet for a bed—from mid. L. *hultiă:* mid. L. *huciă*, and *housiă*, a tunic, a coverlet]: a cover or protection to anything, as to a vessel in harbor. Hous'ings, n. plu. the trappings of a horse.

HOUSSA, *how'sâ*, or according to Dr. Barth, Háusa: district of Africa, in Sudan, forming a portion of the empire of Sókoto (q.v.). The name, however, is used to designate rather the race inhabiting the district, and the language which there prevails, than to mark any distinct political division. H. Proper comprises seven states. The country of the H. is very beautiful, and the inhabitants are spirited, and industrious.—See Barth's *Travels and Discoveries in North and Central Africa.*

HOUSSAYE, *ô-sā'*, Arsene: author: b. Bruyères, France, 1815, Mar. 28; son of a wealthy miller. He removed to Paris and published the novels *La Courrone de Bluets* and *La Pécheresse* 1836, was aided in his literary aspirations by Jules Janin and Théophile Gautier, worked sometimes in conjunction with Jules Sandeau, edited *L'Artiste* 1844–49, was director of the Comédie Française 1849–56, became inspector-gen, of the works of art and the museums of Paris 1856, and a proprietor and managing editor of *La Presse* 1861. His writings include poems, novels, comedies, and sketches of art, artists, literature, and society. His *Histoire de la Peinture Flamande et Hollandaise* (1846) received a govt. subvention of $10,000. Among his works are: *Gallerie de Portraits du XIII^e^ Siècle* (1844, 10th ed. 1874–76); *Philosophes et Comédiennes* (1850); *Les Femmes sous la Régence et sous la Terreur* (1852); *Histoire de l'Art Française* (1860); *Nos Grandes Dames* (1868); *Les Parisiennes* (1869–70); new edition of poems (1877); and *Les Confessions: Souvenirs d'un Demi-Siècle* 1830–1880 (1885).

HOUSTON, *hū'ston:* city, cap. of Harris co., Tex.; on the w. bank of Buffalo bayou; at the head of tide-water navigation on that stream, and the H. and Tex. Central, International and Great Northern, Galveston Harrisburg and San Antonio, Texas and New Orleans, Galveston H. and Henderson, H. East and West Tex., Tex. Western, and a branch of the Gulf Colorado and Santa Fé railroads; 46 m. n.w. of Galveston, 150 m. e.s.e. of Austin. It is connected with Galveston harbor by a ship-canal built by the U. S. govt., and two railroads, the canal accommodating large steamships between Galveston and Clinton, 7 m. below H. The city contains 12 churches; public schools supported by a pro rata of the state school fund supplemented by a fund derived from a special city tax in which 2,861 children of school age were enrolled 1882–3; numerous private schools and academies; city hall and market house (cost $400,000) built 1874; masonic temple; large brick hotel erected on the site of the old capitol of the

Tex. republic; 2 public libraries; 3 daily, 6 weekly, and 2 monthly publications; 2 national banks (cap. $300,000) and 2 private banks; gas, telephone, electric light, water, and sewage systems; and 2 iron bridges spanning the bayou. Beside the machine-shops of the Tex. and New Orleans and the Southern Pacific railroads, its industries comprise 2 cotton-seed oil factories of large capacity, several cotton compresses, flour and grist mill with daily output of 1,100 barrels of flour and meal, 3 plow factories, 4 brass and iron foundries, 3 cooperage shops, large brick manufactories, several beef-packing establishments, and car, wagon, agricultural implement, soap, Portland cement, and fertilizer factories. There are also extensive nurseries in the vicinity. Being the centre of the vast railroad system of Tex., H. controls the trade of the rich grazing and agricultural country surrounding it, and does an extensive cotton business. It is also the seat of the annual state fairs. In 1882 the value of taxable property aggregated $7,766,651; cap. invested in public works, gas, water, street railroads, etc., $350,000, in shipping $360,000, manufactures $1,500,000, banking $700,000, cotton compresses $335,000; and estimated sales of merchandise, manufactured articles, lumber, etc., $24,000,000, an increase in sales over 1881 of $9,000,000. The receipts of cotton in year ending 1881, Aug. 31, were 203,016 bales, an increase of 27¼ per cent. over 1880, and 500 per cent. over 1877; in 1882 there was a general falling off of 30½ per cent. by an unprecedented drought in all cotton states. H. was settled 1836 and was the capital of the republic of Tex. 1837. Pop. (1870) 9,382; (1880) 16,513; (1882) est. 20,000.

HOUSTON, *hū'ston*, SAM: 1793, Mar. 2—1863, July 25; b. Rockbridge co., Va.: soldier and statesman. Soon after the death of his father, the family removed to Tenn. where he was adopted by a Cherokee Indian. In 1813 he enlisted in the 7th U. S. inf., and while serving in the Creek campaign attracted the attention of Gen. Jackson by his extreme bravery. The same year he was promoted sergt. and ensign, and 1814, May, 2d lieut. His acquaintance with the Cherokees led to his appointment as sub-agent at their reservation. He was promoted 1st lieut. 1818, Mar., resigning his commission May, began studying law at Nashville, June, and was licensed to practice in the following autumn. In 1819 he was elected dist.attor. of Davidson district, Tenn., was soon after appointed adj.gen. of the state, 1821 elected maj.gen., 1822 resigned the office of dist.attor., 1823–25 elected member of congress, and 1827 gov. of Tennessee. In 1829 he resigned his office, returned to the Cherokees, adopted their dress, made a trip to Washington in their interest, and lived with them till 1832, when he made a trip to Tex., and was unanimously elected delegate to the convention called to form a constitution, preliminary to the admission of the territory into the Mexican union. The Mexicans, disapproving the constitution, denied the petition for admission and ordered the surrender of Texan arms. The Texans resolved to resist the demand, elected H. gen. for all the territory e. of Trinity river, and when the Mexicans under Santa Anna began preparing to invade Tex., H. was chosen commander-in-chief of the whole territory. He organized a milit. force, was a member of the convention that declared the independence of Tex. 1836, Mar. 2; conducted the war against the invaders with great energy, and on Apr. 21 with only 750 men, fought the main div. of the Mexicans at San Jacinto and routed them with a loss of 630 killed and 730 prisoners, among the latter Santa Anna. The territory was then declared an independent republic, and H. was elected its first pres. 1836, Oct. 22; and re-elected 1841. In 1838 he took the first steps to secure the admission of Tex. into the American union; 1845 the act was accomplished; and 1846, Mar., he entered the U. S. senate, where he served till 1859. He was a candidate for the presidential nomination 1852 and 56, was defeated for gov. of Tex. 1857, and elected 1859, and after the secession of Tex. he was deposed for refusing to take the oath of allegiance to the Confederacy 1861, Mar. 18. He then lived in retirement till his death.

HOUT, n. *howt* [Dut.]: in *S. Africa*, wood. HOUT'BERG, a timbered mountain.

HOVEL, n. *hŏv'ĕl* [originally an open shed supported on posts, sometimes a canopy over a statue: W. *hogl*, a hovel: AS. *hof*, a house: Dut. *huif*, a hood: Icel. *hof*, a temple, a hall: Ger. *hof*, a court, an area]: a shed; a mean habitation: V. to put into a hovel. HOV'ELING, or HOV'ELLING, imp. HOV'ELED, or HOV'ELLED, pp. *-ĕld*.

HOV'ELLERS: see DEAL BOATMEN.

HOVELLING, n. *hŏv'ĕl-ĭng*: process of carrying up two sides of a chimney higher than those less exposed to strong currents of air, in order to prevent it from smoking; or the leaving of openings in all the sides, so that when the wind blows over the top, the smoke may escape below: also the chimney so built.

HOVEN: disease affecting cattle and sheep; caused by eating large quantities of green food, which instead of being digested ferments and forms carbonic acid gas. The stomach is greatly distended, pain is intense, and severe cases, unless relief is speedily obtained, result fatally. In the early stages benefit is sometimes obtained by the administration of three or four drachms of chloride of lime in a small quantity of water. If more convenient, two-ounce doses of ammonia in a quart of water may be given every fifteen minutes. Pulverized charcoal in teaspoonful doses once in fifteen minutes gives relief in mild cases. The charcoal should be mixed with a tumbler full of milk or water to which a little molasses has been added. Copious injections of warm water are also beneficial. If relief is not soon obtained by milder methods, an opening must be made into the stomach to allow the escape of the gas. The trochar is used by surgeons, and is the best instrument, but if it cannot be readily obtained a sharp-pointed knife may be used. The opening must be on the left side, about three inches from the spine, and midway between the hip and the last rib In order to avoid striking the kidney, the knife should pass obliquely in and downward. A quill or pipe-stem should be inserted in the opening. After the gas has escaped the quill should be removed, and the wound closed with a silk stitch or adhesive plaster. In order to remove the mass of undigested food, a smart purgative must be given. For a cow this should consist of twelve ounces of Epsom salts, one ounce of ginger, and four ounces of molasses, mixed with two quarts of water. For smaller creatures the dose should be diminished. The animal should be lightly fed for at least a week after an attack. H. is easily prevented by changing from dry to green food gradually, and by allowing animals when first turned into rank grass or clover to remain only a short time.

HOVER, v. *hŭv'ėr* [W. *hofian*, to hang over: Dut. *huyveren*, to quiver, to shiver]: to hang fluttering over or about; to hang over; to stand in suspense; to wander about one place; in *OE.*, to stay; to wait for. HOV'ERING, imp.: ADJ. hanging over: N. the act or state of hanging in suspense. HOV'ERED, pp. *-ėrd.* HOV'ERINGLY, ad. *-lĭ.* *Note.*—HOVER apparently meant originally 'to abide; to dwell in;' thus derived from or connected with O.Fris. *hovia*, to receive into one's house: O.Dut. *hoven*, to entertain in a house: see Skeat.

HOVEY, *hŭv'ē*, ALVAH, D.D., LL.D.: educator: b. Greene, N. Y., 1820, Mar. 5. He graduated at Dartmouth College 1844, and Newton Theol. Institution, Mass., 1848, and after filling a pastorate in a Bapt. church at New Grenada, Me., 1848–9, was called to Newton Theol. Institution (Bapt.) with which he is still connected. He was asst. teacher of Hebrew 1849–55, and prof. of church history 1853–55, and has been prof. of theol. and Christian ethics since 1855, and pres. since 1868. He was also a member of the executive committee of the American Bapt. Missionary Union 1868–83. His publications include a *Life of Rev. Isaac Backus* (1858); *The State of the Impenitent Dead* (1859); *The Miracles of Christ as attested by the Evangelists* (1864); *The Scriptural Law of Divorce* (1866); *God with Us, or the Person and Work of Christ* (1872); *Religion and the State* (1874); *The Doctrine of the Higher Christian Life, compared with the Teachings of the Holy Scriptures* (1876); *Manual of Systematic Theology and Christian Ethics* (1877, 80); and commentary on *The Gospel of John* in *The Complete Commentary on the New Testament*, of which he is general editor (1885). He received the degree D.D., from Brown Univ. 1856, and LL.D. from Denison Univ. O., and Richmond College, Va., 1876.

HOVEY, *hŭv'ĭ*, ALVIN PETERSON: lawyer: b. Mt. Vernon, Ind., 1821, May 8. He received a common-school education, was admitted to the bar 1843, delegate to the state constitutional convention 1850, judge of the 3d judicial circuit of Ind. 1851–54, appointed judge of the state supreme court 1854, U. S. dist.attor. for Ind. 1856–58, served through the civil war, reaching the rank of brev.maj.gen. of vol., U. S. minister to Peru 1866–70, elected member of congress as a republican 1886, and gov. of Ind. 1888.

HOW, ad. *how* [AS. *hú;* Dut. *hoe;* Dan. *hvor;* O.Fris. *hu,* how]: in what manner; to what degree or extent; for what reason; in what state; by what means; used as an int., as 'how are the mighty fallen!' used as a noun, as 'the when, the *how,* and the wherefore.' **Howbe'it**, conj. *-bē'ĭt,* nevertheless; yet. **How d'ye do?** in what state is your health? **Howev'er**, ad. in whatsoever manner; at all events; at least; nevertheless; still. **How'so**, ad. a familiar term of inquiry—why? in what manner is this? **How'soev'er**, ad. in what manner soever; to whatever degree; nevertheless.

HOW, n. *how* [Icel. *haugr,* a mound: Sw. *hög,* a heap: Dan. *höi,* a hill]: a mound; a hill—chiefly in names of places.

HOW, n. *how,* also **Haugh**, or **Hauch**, n. *haw,* but in Scot. *gh* and *ch* are guttural [Gael. *auch,* or *augh,* a field: Icel. *hage,* a place for pasture]: in *Scot.*, any hollow place; a plain amidst rising grounds; low-lying flat grounds on river-sides.

HOW'ARD, House of: family for centuries at the head of the English nobility. The Howards have held the dukedom of Norfolk since the middle of the 15th c., and have contributed to the annals of the nation several persons distinguished both in politics and in literature. Neither Sir W. Dugdale, nor Collins, nor Sir Bernard Burke claims for the Howards any more ancient origin than Sir William H., learned chief-justice of the common pleas under Edward I. and Edward II., though Dugdale incidentally mentions a tradition that their name is of Saxon origin, and derived either from an eminent office under the crown before the Conquest, or from Hereward, leader of those forces which for a time defended the isle of Ely so valiantly against William the Conqueror. Be this as it may, it is certain that Sir John H., grandson of the above-mentioned judge, was not only admiral and captain of the king's navy in n. England, but sheriff of Norfolk, in which county he held extensive property, which was subsequently increased by the marriage of his grandson, Sir Robert H., with the co-heiress of the ancient and noble house of Mowbray, Dukes of Norfolk. The only son of this union was Sir John H., one of the leading supporters of the House of York, who, having gained early distinction in the French wars of Henry VI., was constituted by Edward IV. constable of the important castle of Norwich, and sheriff of Norfolk and Suffolk. He subsequently became treasurer of the royal household, obtained 'a grant of the whole benefit that should accrue to the king by coinage of money in the city and tower of London, and elsewhere in England;' and further, was raised to the peerage as Lord Howard and Duke of Norfolk. We find him 1470 made capt.-gen. of the king's forces at sea, and he was most strenuous in that capacity in his resistance to the House of Lancaster. Finally, he was created Earl Marshal of England, an honorary distinction still borne by his descendants, and 1484 was constituted Lord Admiral of England, Ireland, and

Aquitaine. He fell next year, however, on Bosworth Field, and, after his death, his honors were attainted, as also were those of his son THOMAS H., who had been created Earl of Surrey. The latter, however, after suffering three years of imprisonment in the Tower of London, obtained a reversal of his own and his father's attainders, and being restored to his honors accordingly, became distinguished as a general, and is celebrated in history particularly for his defeat of the Scotch at Flodden 1513. His son THOMAS H., third Duke of Norfolk, was attainted by Henry VIII., though afterward restored in blood, and by his marriage with a daughter of King Edward IV., became the father of HENRY H., the ill-fated and accomplished Earl of Surrey, eminent as statesman, warrior, and poet, whose execution was the last of the many acts of tyranny which disgrace the memory of Henry VIII: see SURREY, HENRY HOWARD, Earl of.

The Earl of Surrey was beheaded during the lifetime of his father, on whom the same sentence had been passed, when the death of the royal tyrant saved him from the block. His grandson THOMAS H., fourth Duke of Norfolk, in like manner suffered attainder, and was beheaded on Tower Hill for high treason, for his communication with Mary, Queen of Scots. The family honors, however, were again restored, partly by James I., to his grandson, and partly by Charles II. to his great-great-grandson, THOMAS H., who thus became eighth duke, and whose cousin and successor, CHARLES H., ninth duke, was the direct ancestor of the present Duke of Norfolk.

Without attempting a list of all the honors conferred on various branches of the ducal house of H., it is sufficient to say, that in one or other of their widespread branches, the Howards either have held within the last three centuries, or still hold the earldoms of Carlisle, Suffolk, Berkshire, Northampton, Arundel, Wicklow, Norwich, and Effingham, and the baronies of Bindon, Howard de Walden, Howard of Castle Rising, and Howard of Effingham.

The ducal house of Norfolk has had the fate, beyond all others among the English nobility, to find its name interwoven with the thread of English history, and not rarely in colors of blood. The accomplished but unfortunate Surrey, and his scarcely less unhappy father, Thomas H. —whose head was scarcely saved from the block—are 'household words' in the pages of English history; and readers of Shakespeare will have other recollections of the same name allied with other historical events; while those who are familiar with the writings of Pope, will not have forgotten how tersely and pointedly he typifies the glory of ancestral pedigrees by

> 'All the blood of all the Howards.'

Other members of the house of H. have gained a place in the pages of English history. Sir Edward H., K.G., brother of the first Earl of Surrey, was made by Henry VIII. the king's standard-bearer and admiral of the fleet, in which capacity he lost his life in boarding a French vessel off

Brest in action, 1513; his brother, Sir Edmund H., acted as marshal of the horse at Flodden; and his half-brother, Sir Thomas H., was attainted, and died a prisoner in the Tower, for aspiring to the hand of the Lady Margaret Douglas, daughter of Margaret, Queen of Scotland, and niece of Henry VIII., one of whose ill-fated consorts was the Lady Catharine Howard, daughter of Edmund H., who was third son of the Duke of Norfolk.

HOW'ARD, John: 'the philanthropist:' 1726–1790, Jan. 20; b. Enfield, where his father, a retired London merchant, had a country house. H. inherited a considerable estate. In 1752 he married a motherly landlady, 53 years of age, who had nursed him through a severe illness. His wife died; and in 1756, the year of the great earthquake at Lisbon, urged by benevolence, as well as curiosity, he set sail for that city. On this voyage his vessel was taken by a French privateer, and he was confined for some time in French prisons. After his release he married again (1758). The hardships which he had undergone in his imprisonment, combined with the knowledge of prisons and the miseries of prison life which he acquired as high-sheriff of the county of Bedford, 1773 and afterward, determined him to devote himself to prison reform. His second wife had died 1765; and his life hereafter is but a chronicle of his journeys throughout the United Kingdom and the continent, in which he visited the principal prisons and hospitals. H. brought to light the frightful and almost universal abuses prevalent in prisons, lazarettos, and quarantine hospitals on the continent as well as in Britain. His investigations were untiring; he was a scrupulous gatherer of statistics bearing on his great object; and he pressed upon public attention, and on the attention of governments the facts and the suggested reforms. He was not well-educated, nor of an unusual intellectual power; and being a non-conformist he had no high social standing; and he was but as a pioneer in a great wilderness. But he gathered the data for the future science of prison discipline; and his deeply religious devotedness to the cause of those who had none else to speak for them, combined with his personal aid to many unfortunates, stirred the heart of Europe. The name of this plain man—who expended his fortune, and gave his life for his suffering fellow-men—remains an inspiration to benevolent reform. His chief work is *An Account of the Lazarettos in Europe, etc., with Remarks on the Present State of the Prisons in Great Britain and Ireland* (1789). He died at Kherson, in s. Russia, from infection from a fevered patient for whom he had prescribed.

HOW'ARD, John Eager: 1752, June 4—1827, Oct. 12: b. Baltimore co., Md.: soldier. He was the son of a wealthy planter, received a private-tutor education, entered the American army at the outbreak of the revolution, commanded a co. under Gen. Hugh Mercer in the battle of White Plains 1776, Oct. 28; commissioned maj. of the 4th Md. regt. 1776, Dec.; engaged at Germantown and Monmouth; at Camden under Gen. Gates 1780; and at the

Cowpens under Gen. Greene, where his bayonet charge won the day for the Americans, 1781; received a medal from congress; was gov. of Md. 1789-92, U. S. senator 1796-1803, appointed by Washington maj.gen. 1798, and was a candidate for vice-pres. 1816.

HOW'ARD, Oliver Otis, ll.d.: soldier: b. Leeds, Me., 1830, Nov. 8. He graduated at Bowdoin College 1850, and the U. S Milit. Acad. 1854, entered the army as brev. 2d lieut. of ordnance, promoted 2d lieut. 1855, 1st lieut. 1857, was chief of ordinance in Seminole war, Fla. 1857, and asst. prof. of mathematics at the Milit. Acad. 1857, Sep.—1861, June 3. He resigned his regular army commission 1861, June 7, to accept the colonelcy of the 3d Me. vols., was in command of a brigade at Bull Run July 21, promoted brig.gen. of vols. for gallantry there Sep. 3, was twice wounded, and lost his right arm at Fair Oaks 1862, June; rejoined the army 1862, Sep.. and was present at Antietam and Fredericksburg, and promoted maj.gen. of vols. 1862, Nov. In 1863, May, he commanded the 11th army corps at Chancellorsville, and July at Gettysburg; in Oct. was transferred with his command to Tenn., was at Lookout Mountain and Missionary Ridge, and on the expedition to relieve Knoxville. On the consolidation of the 11th and 12th corps into the 20th (1864, Apr.), he was assigned to command the Army of the Cumberland (4th corps), and in July the Army of the Tennessee. He took part in the invasion of Ga , the battles at Dalton, Resaca, Adairsville, and Pickett's Mill, where he was again wounded, the investment of Atlanta, pursuit of the Confederates under Gen. Hood into Ala., the march to the sea, in which he commanded the right wing of the grand army, and the movement culminating in the surrender of Gen. J. E. Johnston 1865, Apr. 26. He was promoted brig.gen. U. S. A. 1864, Dec. 21, brevetted maj.gen. 1865, Mar.; commissioner of the Freedmen's Bureau (q.v.) 1865, Mar.—1874, July; assigned to command Dept. of the Columbia 1874, conducted the expeditions against the Nez Perces Indians 1877 and the Bannocks and Piutes 1878; supt. U. S Milit. Acad. 1881-2, promoted maj.gen. U. S. A. and assigned to command the Div. of the Pacific 1886, and transferred to the Div. of the Atlantic 1888, Dec. 12. He received the degree ll.d. from Waterville College, Me. 1865, Shurtleff College 1865, and Gettysburg Theol. Seminary 1866, and was appointed a chevalier of the Legion of Honor by the French govt. 1884.

HOW'ARD UNIVER'SITY: at Washington, D. C.; established by act of congress 1867, and named in honor of Gen. Oliver O. Howard, one of its founders, and its pres. 1867-73. Though originally planned to afford superior education to colored students, it is now open to all applicants irrespective of race or sex. The institution comprises 9 buildings and maintains 7 departments—theol., medical, law, collegiate, preparatory, normal, and industrial The building and grounds were provided by the federal govt., which also pays a portion of the annual expenses of maintenance. 1889, Jan. 1, the univ. had 38 instructors, 503 students, and 12,000 vols. in its library, and was under the presidency of William Weston Patton, DD.,LL.D. (Congl.), elected 1877, who was also prof. of natural theol. and evidences of Christianity in its theol. department. It also possessed a notable mineralogical cabinet, museum of coins, medals, Indian relics, and curios, and a valuable collection of war pictures and portraits. About two-thirds of the students are colored, but the majority of those in the medical dept., which matriculated 455 and graduated 114 in the 5 years ending 1885-6, are white. Up to 1889 it had afforded superior instruction to over 3,000 students.

HOWDAH, or **HOUDAH**, n. *how'dâ* [Hind. *haudah;* Ar. *hawdaj*, a litter carried on a camel, for the accommodation of Arabian ladies travelling]: a seat fixed on the back of an elephant, for riding on.

HOWDY, or **HOUDIE**, n. *how'dĭ:* in *Scot.*, a midwife.

HOWE, *how*, **ELIAS**: 1819, July 9—1867, Oct. 3; b. Spencer, Mass.: inventor. He was brought up on the farm and in the mill of his father, attended local schools in winter, learned the machinist's trade in Lowell and Boston, and after 5 years' experimenting under discouraging circumstances, perfected his invention of the sewing-machine 1845, and received his first patent 1846. Unable to command the means of manufacturing or overcoming the opposition to labor-saving devices, he worked some time as a railroad engineer; then visited England in the hope of bringing his machine into notice, and while there sold his rights to it in that country and adapted it to corset, umbrella, and valise making; and returning home as a common sailor, found that his invention had been imitated and put in the market in his absence. Friends then enabled him to seek his rights in the courts, and in 1854 the validity and priority of his patents were fully established. Subsequently he acquired wealth, received many medals, including the gold one of the world's fair at Paris 1867, and was awarded the cross of the Legion of Honor by the French government.

HOWE, *how*, **JOHN**: one of the most eminent later Puritan divines, called the *Platonic Puritan:* 1630, May 17—1706, Apr. 2; b. Loughborough, in Leicestershire, to the living of which parish his father had been presented by Abp. Laud. He studied both at Cambridge and Oxford, and after preaching at Winwick, Lancashire, and Great Torrington, Devonshire, was appointed domestic chaplain to Cromwell 1656, in which difficult situation his conduct was such as to win praise even from the enemies of his party. He was of a tolerant and gentle spirit, and as Cromwell's almoner and confidential friend, gave help to many prominent Episcopalian clergymen. At the Restoration, he returned to Torrington, where the position that he had held during the Commonwealth made him an object of close suspicion to the government. The *Act of Uniformity*, however, ejected him from his parish, 1662, Aug. 24, and he wandered about preaching in secret till 1671. Pressed by want, he published a book, *The Blessedness of the Righteous*, which occasioned his invitatation by

Lord Massarene, of Antrim Castle, in Ireland, to become his domestic chaplain. Having the friendship of the bishop of that diocese, and liberty to preach in all the churches under his jurisdiction, he wrote his *Vanity of Man as Mortal*, and began his greatest work, *The Good Man the Living Temple of God* (1676–1702), which occupies one of the highest places in Puritan theology. In 1675, he was called to be pastor of the dissenting congregation in Silver Street, London, and went thither in the beginning of 1676. In 1677 he published, at the request of Mr. Boyle, *The Reconcilableness of God's Prescience of the Sins of Men with the Wisdom of His Councils and Exhortations;* in 1681, *Thoughtfulness for the Morrow;* in 1682, *Self-dedication;* in 1683, *Union among Protestants;* and in 1684, *The Redeemer's Tears wept over Lost Souls*. In 1685, he was invited by Lord Wharton to travel with him on the continent; and after visiting the principal cities, he resolved, owing to the state of England, to settle for a time at Utrecht, where through the influence of his friend Burnett, afterward Bp. of Salisbury, he was admitted to several interviews with the Prince of Orange. In 1687, the *Declaration for Liberty of Conscience* issued by James II, induced him to return to England, and at the Revolution next year he headed the deputation of dissenting clergymen when they brought their address to the throne. Besides smaller works, he published, 1693, *Carnality of Religious Contention;* 1694–5, several treatises on the Trinity; 1699, *The Redeemer's Dominion over the Invisible World;* and he continued writing till 1705, when he published *Patience in Expectation of Future Blessedness*. He died in London.—H. had large tolerance of spirit, deep religious fervor, a cultured breadth of view, and a style which combined the Puritan stateliness with an unusual gracefulness.—See Henry Rogers's *Life and Character of John Howe, with an Analysis of his Writings*.

HOWE, JULIA WARD: author and lecturer: b. New York, 1819, May 27; daughter of Samuel Ward. She received a thorough private education, wrote several plays and poems, married Samuel Gridley Howe, M.D., 1843, mastered the German, French, Italian, Greek, and Latin languages; studied the philosophy of Kant, Spinoza, and Comte; and with her husband conducted an anti-slavery paper, the Boston *Commonwealth*, 1851–53. In 1861, under the inspiration of the mustering of the troops at the national capital, she wrote the famous *Battle-Hymn of the Republic;* and with her husband labored assiduously through the war to promote the interests of the soldiers and the freedmen. She was a founder of the New England Women's Suffrage Club 1869, and the Women's Peace Asso. (London, England), 1872, and pres. of the women's branch of the New Orleans cotton exposition 1884–5. She has preached frequently from Unit. pulpits in the United States, and has been a popular platform lecturer in this country and abroad. Her publications include (poems) *Passion Flowers* (1854), *Words for the Hour* (1857), and *Later Lyrics* (1866); (dramas) *The World's Own* (1855), and *Hippolytus* (1858); *A Trip to*

Cuba (1860); *From the Oak to the Olive* (1868); *Sex and Education* (1874); *Modern Society* (1881); and *Life of Margaret Fuller* (1883).

HOWE (RICHARD HOWE), Earl: 1725–1799, Aug. 5: British admiral: second son of Emanuel Scrope, second Viscount Howe of the Irish peerage. He was educated at Eton. Having a boyish passion for the sea, he left Eton at the age of 14, and went to the South Seas in the squadron under Anson. He was with Admiral Vernon 1745, and at the time of the Scottish rebellion, being in command of the sloop *Baltimore*, took part in the siege of Fort William. He also, with another vessel, beat off two French ships conveying troops and ammunition to the Pretender, for which he was made post-captain. In 1755, his ship, the *Dunkirk*, captured the *Alcide*, a French 64, off Newfoundland. He next served under Sir E. Hawke in the expedition against Rochefort. He was ordered to attack the fort on the isle of Aix with his ship the *Magnanime;* compelled it to surrender after an hour's cannonade, and achieved the only material success of the expedition. He was commodore of the squadron which sailed 1758 for St. Malo. The troops were landed and re-embarked without loss, after destroying all the magazines and the shipping in the port to the number of 120 sail. In the same year he took Cherbourg. Nearly 200 pieces of iron cannon and mortars were here rendered unserviceable; the brass cannon were brought to England; the celebrated basin was destroyed, and twenty ships and vessels were burned or sunk. A second attack upon St. Malo was less successful. The French troops assembled in force at the Bay of St. Cas, and it was only by the intrepidity of H., who went in his own barge into the centre of the enemy's fire, that the re-embarkation of the rear-guard was effected, with great loss of life. In 1758, he succeeded to the Irish title of viscount on the death of his brother, the brigadier-gen. in the old French war in America, who was killed before Ticonderoga. H. took part in the defeat of the fleet under the Marquis de Conflans, and captured the *Hero*, 74 guns. In 1760, he was made col. of the Chatham division of marines, and afterward a lord of the admiralty, and treas. of the navy. In 1776, he commanded a fleet on the American coast, when the conquest of New York, Rhode Island, Philadelphia, and every settlement within the reach of a naval force, testified to his skill and energy. In 1778, he defended the American coast against a superior French naval force under D'Estaing. He was made a viscount of Great Britain 1782, and sent out with a fleet to relieve Gibraltar. He succeeded in disembarking troops, ammunition, and supplies, and then offered battle to the combined fleets of France and Spain, which declined an engagement. He was made first lord of the admiralty 1783, and received an English earldom 1788. When war with France broke out 1793, he took command of the Channel fleet, and next year gained the victory in the Bay of Biscay, which will long be known as that of 'the glorious first of June.' The French fleet consisted of 26 ships, of the line, and the English of 25. H., in his flag-ship, the *Queen Charlotte*, engaged, off Ushant, the French admiral, who in less than an hour crowded all the sail he could carry, followed by as many of his ships as could retreat. The English captured two ships of 80 guns, and four 74's; another 74 sank immediately after she was taken possession of. London was illuminated three nights in honor of the victory. The thanks of parliament were voted to Howe. George III. visited him on board the *Queen Charlotte*, gave him a sword, and made him a knight of the Garter. His last service was in bringing back the mutinous seamen at Portsmouth to their duty 1797.

HOWE, SAMUEL GRIDLEY, M.D.: 1801, Nov. 10—1876; b. Boston: philanthropist. He was educated at the Boston Latin School, and Brown Univ., graduating 1821. He then studied medicine. Being an admirer of Lord Byron, he wished to join him in aiding the Greek revolution, and embarked from Boston for Greece 1824; volunteered as a surgeon; served two years as a guerrilla; organized the medical staff of the Greek army, and was appointed its chief. The Greeks were suffering for supplies, and even for food; and he went to America, and raised large contributions. Returning with food, clothing, and supplies, he formed the colony of Corinth, in which he filled all offices, from governor to constable. Taken down with the swamp-fever 1830, he went to Paris, where he attended medical lectures, and 1832 returned to the United States. Having become interested in the education of the blind, he was sent to Europe, to examine the best institutions, but volunteered in the Polish insurrection, and spent six weeks in a Prussian prison. On his return, the Massachusetts Institution for the Blind was established, and placed under his management. He also established a successful school for idiots; and 1828 published *Sketch of the Greek Revolution*. He revisited Greece 1867, bearing supplies to the Cretans, then struggling for their independence.

HOWE, Sir WILLIAM: 1729, Aug. 10—1814, July 12; b. England: naval officer. He was educated at Eton College, Cambridge, entered the royal dragoons at an early age, commanded the light inf. under Gen. Wolfe at Quebec 1759, was commissioned col. of the 4th foot 1764, promoted maj.-gen. 1772, and succeeded Gen. Gage as commander-in-chief of the British forces in America 1775. He evacuated Boston 1776, Mar.; defeated the Americans at Long Island, Aug.; took possession of New York Sep. 15, gained the battles of White Plains Oct. 28, Fort Washington Nov. 16, and Brandywine 1777, Sep. 11; occupied Philadelphia Sep. 26, repulsed Washington at Germantown Oct. 4, and was succeeded by Sir Henry Clinton 1778, May. Returning to England he was promoted lieut.gen. 1782, gen. 1786, and raised to the peerage of Ireland 1799.

HOWELL, *how'el*, JOHN CUMMING: naval officer: b. Philadelphia, 1819, Nov. 24. He received a collegiate education, entered the U. S. navy as midshipman 1836, June

9; was commissioned lieut. 1849, promoted commander 1862, capt. 1866, commodore 1872, and rear admiral 1877. He was at the capture of Forts Hatteras and Clark, was recommended for promotion for services in both the Fort Fisher fights, chief of staff of the European squadron 1868–70, commandant of the League Island navy yard 1870–72, and the Portsmouth navy yard 1872–74, chief of bureau of yards and docks 1874–78, and commander of the North Atlantic and European squadrons 1878–81.

HOWELLS, *how'ĕlz*, WILLIAM DEAN: author: b. Martin's Ferry, O., 1837, Mar. 1. He removed with the family to Hamilton, O., 1840, learned the printer's trade in his father's newspaper office there, became correspondent of the Cincinnati *Gazette* 1856, news editor of the *State Journal* 1859, U. S. consul to Venice 1861, asst. editor of the *Atlantic Monthly* (Boston) 1866, editor 1872, and editor of the 'Editor's Study' in *Harper's Magazine* 1886. While living in Columbus, O., he began writing poems for publication in the *Atlantic Monthly*, and in his four years' residence in Venice studied the Italian language and literature, and laid the foundation for many of his critical essays in the *North American Review*. Subsequently he studied the language, literature, and political history of France and Spain, and was an editorial contributor to the New York *Tribune*, New York *Times*, and *The Nation*, and a writer of poetry and fiction for *The Century* and *Harper's Magazine*. His style is most graceful and sprightly, clothing commonplace character and incident with an unusual charm. Many of his stories unfold a moral lesson. His publications include the farces *The Parlor Car, The Sleeping Car, The Register*, and *The Elevator; Poems of Two Friends*, with John J. Piatt (1860); *Life of Abraham Lincoln* (1860); *Venetian Life* (1866); *Italian Journeys* (1867); *Suburban Sketches* (1868); *No Love Lost* (1868); *Their Wedding Journey* (1871): *A Chance Acquaintance* (1873); *A Foregone Conclusion* (1874); *Out of the Question* (1876); *Life of Rutherford B. Hayes* (1876); *A Counterfeit Presentment* (1877); *Choice Biographies*, 8 vols. (1877–8); *The Lady of the Aroostook* (1878); *The Undiscovered Country* (1880); *A Fearful Responsibility and Other Tales* (1882). *Dr. Breen's Practice* (1883); *A Modern Instance* (1883); *A Woman's Reason* (1884); *Three Villages* (1885); *The Rise of Silas Lapham* (1885); *Tuscan Cities* (1885); *The Minister's Charge* (1886); *Indian Summer* (1886); *Modern Italian Poets* (1887); and *April Hopes* (1887).

HOWITT, *how'ĭt*, WILLIAM and MARY: husband and wife; joint English authors: WILLIAM H. 1795–1879, Mar. 3; b. Heanor, in Derbyshire: MARY H. b. (Mary Botham), at Uttoxeter; married WILLIAM H. 1823. William H. was educated at various schools in connection with the Society of Friends, to which persuasion his family belonged, as also that of his wife. In his youth, he was fond of outdoor sports, and he celebrated in verse the scenery with which he was familiar. *The Forest Minstrel*, with their joint names on the title-page, was published in the year of their marriage. For three or four years thereafter, they employed themselves in contributions to annuals and magazines, and 1827 a selection from these fugitive pieces appeared under the title of *The Desolation of Eyam.* From this date till 1837, William H. wrote *The Book of the Seasons, Popular History of Priestcraft,* and *Tales of the Pantika.* During the same period, Mary H. produced *The Seven Temptations;* and a country novel, *Wood-Leighton.* In 1837, William and Mary H. removed to Esher, in Surrey, and at that place William H. wrote *Rural Life in England, Colonization and Christianity, Boy's Country Book,* and *Visits to Remarkable Places,* first series. Mary H. at the same time employed herself in writing *Tales for Children,* many of which are popular. In 1840, William H., with his wife and family, removed to Heidelberg, where they resided two years. Mary H. made herself mistress of the northern languages, and translated the works of Miss Bremer and Hans C. Anderson. Meanwhile William H. wrote and translated novels; he also published *The Aristocracy of England;* and *The Homes and Haunts of the British Poets.* In 1852, he went to Australia, where he remained two years; and the works which he issued as a result were very popular, giving information of that then unknown land. In the last years of his life, his wife and he lived in Italy, and William died at Rome. Both in later years became believers in spiritism. Among William's later works are: *Land, Labor, and Gold, or Two Years in Victoria; The Ruined Abbeys of Great Britain; The Northern Heights of London; The Illustrated History of England,* 6 vols., completed 1861; *History of the Supernatural in all Ages and Nations* (1863); *Discovery in Australia, Tasmania, and New Zealand* (1865); and *The Mad War Planet and other Poems* (1871).

HOWITZER, n. *hŏw′ĭts-ėr* [Gr. *haubitze*]: short mortar or gun mounted on a field-carriage, used for throwing shells. As, for this purpose, no great range is necessary, a small charge of powder suffices; and the H. can be made, in proportion to its large bore, extremely light. It combines in some degree the accuracy of a cannon with the calibre of a mortar; and while equally effective at short ranges, is far more portable than either. That the powder, on its expansion, may act with full force on the shell, it is confined in a hemispherical chamber of smaller diameter than the rest of the bore, the mouth of which is completely closed by the shell when rammed home. The Coehorn H. much used in India for mountain-service, is a small gun, light enough to be borne by a horse up hilly defiles, etc.

HOWKER, n. *how′kėr* [Dut. *hoeker*]: a Dutch vessel with two masts; a one-masted fishing-boat same as HOOKER.

HOWL, n. *howl* [OF. *huller* and *uller*, to howl—from L. *ŭlŭlārĕ*, to shriek, to howl—from *ŭlŭlă*, an owl: Ger. *heulen;* Dut. *huylen;* Gr. *hulain*, to howl]: the cry of a dog or wolf; a piercing cry, arising from pain or fear: V. to cry as a dog or wolf; to utter cries of terror or anguish; to roar or screech loudly, as the wind. **Howl'ing**, imp.: Adj. filled with howling beasts, as a howling wilderness; producing screeching or screaming sounds, as a tempest; dreary: N. loud outcries or mournful sounds. **Howled**, pp. *howld*. **Howl'er**, n. *-ėr*, one who howls; a monkey so named.

HOWL'ER, or Howl'ing Monk'ey, or Sten'tor (***Mycetes***), *Alouatte* of the French: genus of monkeys, in the n.e. parts of S. America, remarkable for dilatation of the Hyoid (q.v.) bone into a hollow drum, which communicates with the larynx, makes a conspicuous external swelling of the throat, and gives prodigious power to the voice, enabling these animals to emit hideous sounds which are heard miles away. They live chiefly among branches of trees, and take extraordinary leaps from one to another, taking hold by the tail as readily as by the hands, and often swinging by it alone. They are gregarious, and unite their voices in concert, so as to produce a most deafening noise. The monkeys of this genus, the largest monkeys in the new world, are regarded as in their low intelligence and their fierceness of disposition American representatives of the baboons, while in many of their habits they more nearly accord with the gibbons of the old world. There are not many species.

Howling Monkey (*Mycetes ursinus*).

HOWLET, n. *how'lĕt* [F. *hulotte*—dim. from L. *ŭlŭlă*, an owl (see Howl)]: a bird of the owl kind.

HOWTH, *hōth:* small peninsula on the e. coast of Ireland, forming the n. shore of the Bay of Dublin. It is two and a half m. long by about two m. broad, with an area of about 2,600 acres. H. is connected with the mainland by a low and narrow isthmus, and its insular appearance greatly enhances the picturesque effect of Dublin Bay.

HOX, v. *hŏks:* in *OE.*, another spelling of Hock, which see; to hamstring. **Hox'ing**, imp. **Hoxed**, *hŏkst*.

HOY, n. *hoy* [Dut. *huy* and *heu;* F. *heu*]: a large boat, or small vessel, sometimes with one deck; differing little from a small sloop or smack.

HOY! int. *hoy* [Dut. *hui*, hoy! come!]: in *sea-faring terms*, when one ship hails another, the exclamation is 'What ship, hoy?' that is, 'Tell us how you are and whither bound;' stop! stay!

HOY: one of the Orkney Islands, s.w. from Pomona, or the Mainland, from which it is separated by a passage about 2 m. in width. It is 14 m. long and 6 m. broad, and its population in 1881 was 1,380. Unlike the most of the islands of its group, Hoy rises abruptly from the sea, with precipitous cliffs 1,000 ft. in height fronting the w.; the highest eminence, Wart Hill, is 1,555 ft. above sea-level. It has in the s. the harbor of Long Hope, said to be the finest in the Orkneys, and defended by a fort and two martello towers. Among the curiosities of the island is the Dwarfie Stone, a block of sandstone, 22 ft. long, 17 ft. broad, and 7 ft. high. One end of it has been hollowed out by iron tools, the marks of which are visible, and a kind of apartment formed. In the s.w. of the island is the Old Man of Hoy, a pillar of rock 300 ft. in height.

HOYA, n. *hŏy'ă* [after *Hoy*, gardener to Duke of Northumberland, died 1821]: genus of tropical plants of the order *Asclepiadaceæ*, having a 5-cleft wheel-shaped corolla, and a 5-leaved spreading fleshy corona. Some of the species are common in hothouses, and from the appearance of their flowers, they are called *Wax-plants*.

HOYDEN: see Hoiden.

HUAHEINE, *hô-â-hē'nā:* most easterly of the Society Islands (q.v.).

HUALLAGA, *wăl-yâ'gâ:* river of Peru, rising on the e. side of the Andes, near lat. 11° s., 13,200 ft. above the sea. After a northerly course of about 500 m., with many considerable falls, it enters the Amazon.

HUAMANGA, *wâ-mân'gâ* (now called Ayacucho): city of Peru, dept. of Ayacucho, on an affluent of the Apurimac. It was founded by Pizarro 1539, on the route between the old and new capitals of the country, Cuzco and Lima. It has a cathedral and a university. Near H., 1824, Dec. 9, was completed the independence of Spanish America, by the decisive victory of General Sucré, leading the combined forces of Peru and Colombia (the latter then comprising Ecuador, New Granada, and Venezuela) which defeated the last Spanish army ever seen on the new continent. Pop. abt. 25,000.

HUA'NACA: see Guanaco.

HUANCAVELICA, *wân-kâ-vā-lē'kâ:* town of Peru, about 80 m. w.n.w. of Huamanga, 160 m. s.e. of Lima; 12,400 ft. above the sea, on the e. declivity of the Andes. Its inhabitants work the neighboring mines of gold, silver, and quicksilver. Pop. abt. 4,000.

The *department* of Huancavelica is in the interior of Peru, s.e. of the dept. of Lima; 10,814 sq. m.; mountainous and unfruitful. Quicksilver is produced. Pop. (1876) 104,140.

HUANUCO, *wâ'nô-kō:* town of Peru, on an affluent of the Huallaga (q.v.), also named Hunauco; on the e. declivity of the Andes, 180 m. n.n.e. of Lima. It is one of the most ancient places in the country. Pop. 7,000.

The *department* of Huanuco is n. of the dept. of Lima: it has a rugged surface, healthful climate, and fertile soil.

HUARAZ, or HUARAS, *wâ-râs':* small town of Peru, in a valley of the Andes, on the right bank of the river Santa, 150 m. s.e. of the seaport of Truxillo. Pop. 6,000.

HUB, n. *hŭb* [OE. *hob*, a false step: Dut. *hobbelen*, to rock as a boat]: a block of wood laid to the wheel of a carriage to stop its motion; the projecting nave of a wheel; the hilt of a weapon.

HUB: see HOB 1.

HUBBARD, *hŭb'ėrd*, WILLIAM: 1621–1704, Sep. 14; b. England: Congl. minister. He came to America 1630, graduated at Harvard College 1642, was ordained 1665, was pastor of the Congl. church at Ipswich, Mass., 1665–1703, and pres. of Harvard College 1688. He was author of *The Present State of New England* (1677), *Memoirs of Maj.-Gen. Denison* (1684); a *History of New England* (pub. by the Mass. Hist. Soc. 1815), *Sermons* (1684), and *Testimony of the Order of the Gospel in Churches* (1701).

HUBBARDTON, *hŭb'ėrd-ton:* town in Rutland co., Vt., 48 m s.w. of Montpelier; scene of a battle between the British under Gen. Fraser and the rear-guard of the American army, that had been forced to evacuate Fort Ticonderoga 1777, July 6, under Cols. Warner, Francis, and Haile. The Americans, surprised, July 7, by an overwhelming force of the British, which was reinforced during the engagement, were defeated after several brilliant charges, and forced to retire. The British loss was heavy. A commemorative monument was erected on the field 1859, July 7.

HUBBUB, n. *hŭb'bŭb* [a repetition of *hoop*, representing a cry: AS. *wóp*, an outcry: comp. Gael. *uabhan*, fright, terror]: a great noise of many confused voices; an uproar; a tumult.

HUBER, *hô'bėr*, F. *ü-bär'*, FRANÇOIS: 1750, July 2—1831, Dec. 21, b. Geneva: Swiss naturalist. At an early age he lost his eyesight, and some years after this, married a Mademoiselle Lullin, by whose assistance, and that of an intelligent domestic, named Burnens, he made a vast variety of original and important observations on the habits of bees, which did much to correct the errors and imperfections of previous writers. H.'s first work was entitled *Lettres à Ch. Bonnet* (1792), reprinted, 1796, again, 1814, under the title *Nouvelles Observations sur les Abeilles.* In his latter years, H. derived important aid in his studies from his son Pierre (1777–1840), author of a valuable treatise on the *Habits of Ants,* and of several able memoirs relating to Zoology and Meteorology, in the Mem. Soc. Genève, 1820–30.

HUBER'TUSBURG: royal hunting-seat, not far from Leipzig, built 1721 by Augustus III., then prince, afterward king and elector. It was much injured during the Seven Years' War, and has historic celebrity for the treaty by which that war was ended, called the Peace of H., signed here 1763, Feb. 15, by the representatives of Prussia, Austria, and Saxony. By it the position of Prussia was established among the great powers of Europe. Maria Theresa relinquished all claim to the provinces which had been acquired by Prussia; and Frederick the Great restored his electorate to the king of Poland, elector of Saxony.

HUBNER, *hüb'nėr*, RUD. JUL. BENNO: 1806, Jan. 27—1882, Nov.; b. Oels, Silesia: eminent painter of the modern German school. He attracted attention first by his picture *Ruth and Boaz.* In 1839, he settled at Dresden, where he was director of the picture gallery, 1871–82. His principal productions are: *Samson overthrowing the Pillars of the Temple, The Departure of Naomi, Christ and the Evangelists, Job and his Friends, The Lovers of the Canticles, Happiness and Sleep, Christ in the midst of the People, The Fisherman* (from Goethe's ballad), *The Golden Age,* and *The Dispute between Luther and Dr. Eck.* H. belonged to the great historic and religious school of German art.

HUC, *ük,* ÉVARISTE RÉGIS: distinguished French missionary-traveller: 1813, Aug. 1—1860, Mar. 31. He was educated in his native city, and about his 24th year he entered the missionary congregation of the Lazarist Fathers, and received holy orders at Paris, 1839. Almost immediately after his ordination, he joined the missionary expedition of his order to China. After about three years of missionary life in the n. districts of China, the new apostolic vicariate of Mongola was founded, and H., in company with a priest of the same congregation, Père Gabet, and a single native Chinese convert, undertook to explore the new district, and to ascertain its extent and its missionary capabilities. After a few months' study of the Tartar dialects, they set out from the missionary station, n of the Great Wall, called Si-wang, toward the close of 1844; and after a journey of excessive hardship over the high table-lands of Tartary, they took up their quarters for some months in one of the Lamaseries, or Tartar monasteries. Having here become familiarized in some degree with the Tibetan language, they succeeded in making their way, 1846, Jan., to H'lassa, cap. of Tibet, and residence of the Grand Lama; but scarcely had they settled in that city, when an order for their immediate expulsion from the country was obtained from the Lama by the Chinese resident in H'lassa. They were not permitted to choose their own route homeward, but having been put in charge of a Chinese escort, were carried back a journey of nearly 2,000 m. to the extreme south, and arrived 1846, Oct., at Macao, where they were subjected to a tedious trial by the Chinese tribunals. In the end, they were permitted to return to the missionary station of Si-wang, from which they had started. H.'s health having been completely broken down, he sailed from Macao 1849, Jan., and in the autumn of the same year reached his native city, Toulouse. In the following year he returned to Paris, where he published *Souvenirs d'un Voyage dans la Tartarie, le Thibet, et la Chine pendant les Années* 1844–46 (2 vols. Paris 1852). This was followed, 1854, by a similar record of his Chinese experience (*L'Empire Chinois*, 2 vols. 3d edit. 1857); and 1857 by an elaborate historical work on Christianity in China (*Le Christianisme en Chine*). All these have been translated into English and most other European languages. The strangeness of some of the incidents recorded in the book on Tibet provoked some incredulity in certain quarters; but Capt. Blakiston, a later traveller in the same regions, which had hitherto been almost a *terra incognito* for Europeans, bears unhesitating testimony to the fidelity of Père Huc's narrative and description, which still more recent travellers fully confirm. H.'s accounts however lack the value which would be given by precise scientific data. During his latter years, Père Huc, in order to devote himself more freely to his literary occupation, withdrew from the Lazarist congregation. His health never fully recovered from the fatigues of his Tibetan expedition, and he died in Paris at the early age of 46.

HUCKABACK, n. *hŭk'ă-băk* [Low Ger. *hukkebak*, pick-a-back]: perhaps originally meaning 'pedler's wares;' a rough coarse kind of linen used for common towelling, so woven as to be partly raised in figures like damask.

HUCKLE, n. *hŭk'l* [a dim. of prov. Eng. *huck*, a hook: Dut. *hucken*, to draw one's self together, to bend under a load: Ger. *höcker*, a hump, a knob: Icel. *hæcka*, to rise; *huka*, the hip]: a hump; a small joint; the hip; among *prov. miners*, the summit or apex of an anticline or saddle-back. HUCKLE-BACKED, *-băkt*, having round shoulders. HUCKLEBERRY, the black whortleberry (see WHORTLEBERRY); Huckleberry is now the usual colloquial form. HUCKLE-BONE [Ger. *bein*, bone]: the hip-bone.

HUCKSTER, n. *hŭk'stėr* [Ger. *höcker* and *höker*, a hump on the back, a petty retailer: Dut. *hoecker;* Dan. *hökre*, a chandler, a petty tradesman: O.Dut. *huycken*, to stoop down, to crouch: Icel. *húka*, to sit on one's hams: Low Ger. *huken*, to crouch]: a pedler, or one who carried his pack upon his back; a small retailer of provisions, etc.; a mean, trickish fellow: V. to deal in small articles or in petty bargains. HUCK'STERING, imp. HUCK'STERED, pp. *-stėrd*, *Note.*—HUCKSTER is really a fem. form corresponding to *hawker*, masc.

HUDDERSFIELD, *hŭd'ėrz-fēld:* parliamentary and municipal borough and important manufacturing and market town of England, in the West Riding of Yorkshire, in a fertile district, on an acclivity rising from the left bank of the Colne, 16 m. s.w. of Leeds, abt. 25 m. n.e. of Manchester. It is remarkably regular, is well built and drained, and very healthful. Upon the Holme and the Colne, which unite in the town, are numerous mills for woolen fabrics, and for fulling and washing the goods manufactured. H. is in a district rich in coal, and its natural advantages are enhanced by extensive and direct railway connections. A market hall in the Gothic style was opened here 1880. Among the churches, several are noteworthy in an architectural view. It has a proprietary college, now in connection with the London Univ.; a collegiate school, and many other educational institutions; a circular cloth-hall, 2,640 ft. in circumference, in which a market for woolen goods is held every Tuesday, and for general produce every Saturday; an infirmary; and in the vicinity the Lockwood Spa Baths, where the water is strongly sulphureous. H. is the chief seat in n. England of what is called the 'fancy trade,' comprising shawls, waistcoatings, flushings, etc., of the most elegant patterns and finest fabrics; it has also extensive manufactures of narrow and broad woolen fabrics, kerseymeres, serges, and cords. It is connected by canals with the Mersey and the Humber. Pop. of parl. bor. (1871) 74,358; (1881) 87,146.

HUDDLE, v. *hŭd'l* [Swab. *hudlen*, to do in an imperfect manner: Ger. *hudeln;* Dut. *hoeteln*, to bungle or botch: comp. Gael. *cadall*, a confused skirmish]: to throng or crowd in a disorderly manner; to put on or up in haste or disorder; to crowd together in confusion: N. a crowd; confusion. **HUDDLING**, imp. *hŭd'lĭng*. **HUDDLED**, pp. *hŭd'ld*.

HUDIBRASTIC, a. *hū'dĭ-brăs'tĭk:* similar to the style of the poem *Hudibras;* doggerel.

HUDSON, *hŭd'son:* city of N. Y., cap. of Columbia co. beautifully situated on the e. bank of the Hudson river, 114 m. n. of New York, 29 m. s. of Albany. It is a well-built city, is a port of entry at the head of ship navigation; and formerly had much shipping in foreign trade and the whale-fisheries. H.'s river trade is still important, and it has railway connections in all directions. It is now engaged chiefly in the manufacture of iron, and in the export of agricultural staples. It has a fine court-house, city hall, eleven churches, public libraries, orphan asylum, and five newspaper offices. H. was settled 1784, and was known as Claverack Landing: it became a city the next year. Pop. (1870) 8,615; (1880) 8,669.

HUDSON, GEORGE: English railway director and speculator: 1800–1871, Dec. 14; b. York. He was apprenticed to a linen-draper in that city, where he subsequently carried on business for himself. He took an early share in railway speculation, and was appointed chairman of the North Midland Company. His plans of management were carried out, schemes of railway annexation and extension were undertaken, embarrassed lines were relieved, and rivals were subdued. He was elevated into the dictatorship of railway speculation; everything he touched turned into gold; and H. was known as 'the Railway King.' The shares of the lines with which he consented to become connected went up, and he was said to have made £100,000 in one day. He bought large estates; was three times elected lord mayor of York; was sent to parliament by the electors of Sunderland; and his acquaintance was courted by persons of the highest rank. When the railway mania was at its height, a statue to H. was proposed; and names were put down for £25,000; but before the money could be collected, the popularity of the 'Railway King' was on the wane. His connection with the Eastern Counties railway led to some exposures. The accounts had been 'cooked;' matters had been 'made pleasant;' and dividends had been paid out of capital. Suspicions were excited in regard to his direction of other companies, shares fell, the bubble burst, the railway monarch was deposed, and encountered nothing but invective from quarters which had pursued him with adulation. Every board-room was closed against him, and his suddenly-acquired gains were almost swept away. The constituency of Sunderland, however, continued to elect him as their representative until 1859, March. He afterward resided abroad, in comparatively narrow circumstances, and died in London. While his fault of oversanguineness in his schemes occasioned great losses to many, he was useful in introducing railways into England against the long hindrance which had been interposed by the powerful landed interest.

HUDSON, Henry (or Hendrik): distinguished English navigator. His early history is unknown. He undertook his first voyage for the discovery of a northeast passage, 1607, Apr. 19, sent out by the Muscovy Company, and sailing from the Thames, in a small vessel (the *Hopewell* of 60 tons) with ten sailors, but failed in this attempt. In his second voyage, 1608, Apr. 22—Aug. 26, he reached Nova Zembla. He undertook a third voyage, 1609 from Amsterdam, at the expense of the Dutch E. India Company. Giving up all hope of finding a n.e. passage, he sailed for Davis' Strait, but came upon the American continent about 44° n. lat., and steering southward, discovered the mouth of the river which now bears his name. Hoping to find this great water-way a passage to China, he sailed up the Hudson as far as to the head of tide-water. He sailed upon his last voyage, 1610, Apr., with 23 sailors, and reached Greenland in June. Steering w., he discovered the strait now known as Hudson's Strait, passed through it, and entered the great bay, which has received the name of Hudson's Bay. Although very insufficiently supplied with provisions, he adopted the resolution of wintering in these desolate regions, in order to prosecute his discoveries further in the following spring; but his provisions became so nearly exhausted, that he was under the necessity of returning. An incautious utterance of his opinion, that in the destitute condition to which he was reduced, he would be obliged to leave some of his people behind, led to his death. The sailors mutinied, and placed him, with his son and some others who adhered to him, in a small boat, at the mercy of the waves and of the savages, 1611, July 1. His fate was revealed by one of the conspirators. An expedition was sent from England in quest of him. but no trace of him or of his companions in misfortune was ever discovered. Hudson's Bay was thoroughly explored, 1612-14, by Sir Thomas Butler, Gibbons, and Baffin. See *Henry Hudson the Navigator*, Hakluyt Soc. 1860.

HUDSON, Sir JAMES, G.C.B.: diplomatist: b. 1810, in London; son of a Yorkshire gentleman. He was educated at Rugby and Westminster, and studied at Paris and Rome. He was made private sec. to William IV.; and after the king's death, entered the diplomatic service, and became sec. of legation at Washington 1838, at the Hague 1843, and at Rio de Janeiro 1845. In 1850, he was appointed minister at Rio, was transferred to Florence 1851, and to Turin 1852. His counsels exercised great influence over the Sardinian government. The long train of stirring events that resulted in the united and independent kingdom of Italy, demanded the vigilance, and sometimes the active interference, of the British minister at the court of Turin. H. never forgot that he was the representative of a constitutional government which sympathized with the aspirations of the Italians for national independence, and which had therefore the privilege to warn and counsel as well as to animate. He retired from Turin, 1863.

HUD'SON (or NORTH) RIVER: principal river in N. Y., and one of the noblest and most important in the United States. It rises in the Adirondack Mountains, 4,000 ft. above the level of the sea, and its head-streams are the outlets of many mountain lakes, in the n.e. portion of the state. At Glenn's Falls, it has a fall of 50 ft., and soon afterward, taking a southerly course, runs nearly in a straight line to N. Y., where its mouth forms the magnificent harbor of that metropolis. At Troy, 151 m. from its mouth, it is affected by the tide, and becomes a broad deep river, having a width of 300 to 700 yards, and with depth for the largest river steamboats, and for ships from Hudson, 114 m. At Newburg, 61 m. from New York, the river enters the Highlands, which rise abruptly from the water 1,200-1,600 ft. Here the scenery for 16 to 20 m. is of great beauty and grandeur, and is the admiration of travellers. Several of the heights are crowned with the ruins of fortifications, built to prevent the passage of British ships in the War of Independence. Here was the scene of Arnold's treason, and the sad fate of Major André. Emerging from the Highlands, the river widens into a broad expanse called the Tappan Zee, 3½ m. wide, 10 m. long. Below, on the w. bank, on the N. J. shore, rises an almost straight and perpendicular wall of trap rock, from the river's brink to a height of 300 to 500 ft., called the Palisades, extending 15 m. to a point opposite the upper portion of the city of New York. The river, here from one to two m. wide, enters into New York Bay. On its w. shore are the cities of Hoboken and Jersey City, opposite New York. Its whole length is about 300 m., and its principal tributaries are the Schroon, Sacondaga, Hoosic, Mohawk, Walkill, and Croton. The steamboats which ply on the H. are among the swiftest and most superb in the world. Some are more than 400 ft. long, fitted up with great luxury, and attain a speed of 23 to 24 m. an hour. The Hudson River railway runs along the margin of the river on the e. bank, to Albany: on the opposite side is the West Shore railroad. By this river, and the Erie canal, and several railways, New York is connected with the great lakes and the west. The river is named from the English navigator who first entered and explored it 1609: see HUDSON, HENRY: it had been seen by Verrazzano, 1525. Its Indian name was Shatemuc. Near New York it is often called the North River, an old designation in distinction from the Delaware, which was the South River. North River is now so called as distinguished from the East River which connects New York Bay with Long Island Sound. The first successful experiment in steamboat navigation was made on this river by Robert Fulton, 1807.

HUD'SON'S BAY: spacious gulf, or rather sea, toward the n.e. corner of the American continent, forming the central basin of the drainage of the n. half of N. America; it has been called the Mediterranean Sea of N. America. It communicates with the Arctic Ocean by several passages whose navigation is impeded by ice; and with the n. Atlantic by Hudson's Strait, whose more northerly passage at the e. end is called Frobisher's Strait. Including the southern prolongation of James's Bay, H. B. is about 1,000 m. in length, with average width of 600 m.; 500,000 sq. m.; the area of its basin cannot be much less than 3,000,000 sq. m. Toward the s. and w. its basin meets that of the St. Lawrence, the Mississippi, the Columbia, and the Mackenzie. Its depth is about 70 fathoms; on the w. coast, there is an average rise and fall of 11 to 12 ft. at spring-tides. As far as is known, neither the bay nor strait are ever entirely frozen over; though beset by detached floes of ice, which render navigation difficult for sailing-vessels. Steam-ships can make the voyage, and the land may be approached by steamers from about the middle of June to the end of October. Of the 30 rivers of considerable magnitude which flow into the bay, the Nelson river from the Winnipeg system, touching the Rocky Mountains on the w., is most important; it is 400 m. in length, but navigable by steamer only 70 or 80 m. inland. The Churchill, somewhat larger than the Rhone, is next in size; it has a deep and comparatively narrow mouth, which can be entered with ease by the largest ships at all states of the tide. The climate of H. B. is somewhat milder than is generally supposed; its s. extremity is s. of the latitude of London, and no part of it lies within the Arctic Circle. To the s. and w. of James's Bay the land is suitable for stock and dairy farming. The only business developed to any extent is the fur trade by the Hudson's Bay Company; neither the soil, timber, nor minerals have been largely drawn upon. Ironstone, manganiferous iron ore, galena, and plumbago are found near Hudson's Bay.

H. B. derives new interest and importance as the proposed highway by which a more direct connection may be formed with England for the transport of agricultural produce from Manitoba and the N.W. Provinces of Canada. With this end in view, the route for a railway from Winnipeg to Churchill on H. B. was surveyed, 1880. This route will shorten the distance to England, compared with the Montreal route, by 1291 m.; and compared with the New York route, by 1,700 m. See the valuable paper of Dr. Robert Bell in the *Proc. of the Geog. Soc.* (1881).

HUD'SON'S BAY COM'PANY: English corporation erected 1670, by Charles II., consisting primarily of Prince Rupert, the king's cousin, and certain specified associates. It was invested with the absolute proprietorship, subordinate sovereignty, and exclusive traffic of an undefined territory, which, under the name of Rupert's Land, comprised all the regions discovered, or to be discovered, within the entrance of Hudson's Strait. Rupert's Land was decidedly the most extensive of the dependencies of England, being held to embrace all the lands that poured water into Hudson's Bay or Hudson's Strait. For more than a century, however, the grantees confided themselves to the coast. About the period of the formation of the American republic, their advance into the interior was accelerated, if not occasioned, by the more mature development of an ancient rivalry. From about the middle of the 17th c., New France, besides stretching, in name, to the arctic circle, had, in reality, advanced to the shores of Hudson's Bay; and this position of affairs was virtually recognized by that provision of the letters patent, which exempted from their operation any actual possessions of any Christian prince or state. Though the claims of France, after being confirmed 1697 by the treaty of Ryswick, were at last abandoned 1713 by the treaty of Utrecht, yet, in fact, adventurers from the great lakes, while Canada was still French, had penetrated, in quest of peltry, far up the Saskatchewan toward the Rocky Mountains. Such overland enterprises—interrupted, for a few years, by the conquest and cession of 1759–63—soon came to be prosecuted, with more systematic energy, under English auspices, till, 1783, they led to the formation of the Northwest Company of Montreal. After an age of stubborn competition, the Hudson's Bay Company coalesced, 1821, with its formidable opponent.

But the two members of the new partnership has already almost doubled the original field of contention, The older association had, about 1770, traversed the basin of the Coppermine; and, fully 20 years later, the younger one had descended the Mackenzie to the Arctic Sea, and had, through the barrier of the Rocky Mountains, reached the Pacific Ocean. Even in general equity, a body, which now represented all the discoveries, had a peculiar right to the discoveries themselves; but beyond general equity, a secondary provision of the letters-patent of Charles II. had regarded such discoveries, at least for the purposes of trade, as accretions to the primary grant. Accordingly, when, 1821, parliament, in view of the intolerable evils of competition, empowered the crown to issue licenses for the 'Indian Territories'—expressly declared to be all the wildernesses of British N. America to the w. of Rupert's Land—the government exercised this statutory authority in favor of the Hudson's Bay Company, as recast and extended by the coalition. So far as commerce was concerned, there was now no practical difference between Rupert's Land and the Indian Territories, excepting that the charter of the former was perpetual, and the license of the latter was to be for 20 years at a time; and thus the newly-modified association virtually ruled the western world, through 75° of long., from Davis' Strait to Mount St. Elias, and, through 28° of lat., from the mouth of the Mackenzie to the borders of California.

About 20 years after the coalition, Oregon from the borders of California to the parallel of 49° n., which had always been open to Americans by international arrangement, was given up to the United States by the same treaty which yielded sections of Canada and New Brunswick; in 1859, the rest of the tramontane tract was brought within the pale of civilization as the national British colonies of Vancouver's Island and British Columbia; and lastly, as the second term of the license was, 1859, also permitted to expire without renewal, the remainder of the 'Indian Territories' was then potentially thrown back into the condition whence the statute of 1821 had taken it.

Finally, 1869, the company made a formal cession to the British government of whatever territorial claims remained, receiving an indemnity of £300,000 from the Dominion of Canada, to which the whole territories were forthwith annexed. It was, however, stipulated that the company should retain all its forts, with ten acres of ground at each, and one-twentieth of all the land from the Red river to the Rocky Mountains, besides blocks to which it made special claim. This reservation is not very pleasing to the Canadians, as the land is meanwhile kept unimproved, though it gains indefinitely in value by the improvements made around it by the labor of others. Since the transfer to Canada, the government has entered into treaties with the Indians, by which the latter have surrendered their right to the land on certain conditions, particularly the setting apart of a certain amount of land for their exclusive use, the annual payment of five dollars to each individual, and certain presents of clothing, food, utensils, and cattle. The territory has been organized in three divisions: 1. Manitoba (see RED RIVER SETTLEMENT); 2. Keewatin, embracing that portion of the Hudson's Bay Territory e. and n. of Manitoba; and 3. The Northwest Territory, including the region between these and British Columbia. During its monopoly, the company kept strict faith with the Indians (fulfiling every bargain, though it possibly bought for a few trinkets furs worth pounds), and gained their confidence by kindness and sympathy. Its great influence for good over the half-breeds also is not to be forgotten. Over a territory with ports further apart than London and Mecca, Paris and Samarcand, the organization of the company was perfect, and its operations went on as by clock-work.

Since the annexation of the territory to Canada, there has been a rapid influx of immigrants; for a finer grain-growing country than that n.w. of Lake Superior does not lie under the sun. The loss of territorial control has not in the least affected the H. B. C. as a trading community. Its organization is still complete. A single share, between one year and another, ranges in dividends from about £300 to about £500; and the ordinary revenue averages about £80,000, so as to yield about £48,000 to the proprietors, and about £32,000 to the wintering partners. This income is almost entirely from furs. A very important item of profit has been the sale of their reserved lands in the lately organized Canadian territories. The gross amount of the sales of H. B. C. lands, to 1883, Feb., amounted to £1,240,000. Of this sum, £300,000 had been paid to shareholders, for the reduction of the stock. The working organization of the company is as follows: A young man commences with the rank of apprentice-clerk, or apprentice-postmaster. These postmasters are those in charge of the various posts which have been from time to time erected around the central one, at distances varying from about 200 to 500 m. Such settlements are supplied with goods in accordance with the amount of trade likely to be done. In the fall of the year the Indians collect and get what is called 'debt' proportionately with their known qualifications as hunters. They then depart to their hunting-grounds, and are visited at various periods during the winter by the servants of the company (generally half-breeds), who bring back with them any peltries (or furs) that may be on hand. These, in turn, are made into packs and transmitted, in spring, by canoes to the central post, and thence transmitted either to England or Canada. These skins are given to the traders in repayment of the 'debt' paid to the Indians.

For further particulars, see Fitzgerald's *Examination of the Charter and Proceedings of the Hudson's Bay Company*, and Montgomery Martin's *Hudson's Bay Company's Territories and Vancouver's Island*, both published 1849—perhaps the leading works on opposite sides of a vexed controversy.

HUD'SON'S STRAIT: see HUDSON'S BAY.

HUE, n. *hū* [AS. *heaw*, form, appearance—from *heawan*, to show: Goth. *hiwi*, show, appearance: Sw. *hy*, complexion]: color, or shade of color; a compound color in which one of the primaries predominates; tint or dye. HUED, a. *hūd*, colored; having a color. HUE'LESS, a. *-lĕs*, without color.

HUE, n. *hū* [F. *huer*, to hoot, to shout; Bret. *huda*, to cry to frighten wolves; W. *hwa*, halloo: O Sw. *huta*, to hoot]: a clamor; an outcry. HUE AND CRY, the legal pursuit of a thief or other offender by sending a description of him to police-offices, etc.; anciently, the pursuit of a felon, with horns, and loud outcries or clamor to give alarm. Whoever arrested the person pursued was so far protected, that he required no warrant to justify the arrest; and even if the party turned out to be no felon, no action could be brought if the arrest was *bonâ fide.* But it was not only a ground of action, but an offense subject to fine and imprisonment, to maliciously and wantonly raise the hue and cry against a person. It was the duty of all persons to join in a hue and cry. Hue and cry in this sense is abolished.

HUÉ, *hwā* or *hô-ā'*, or HUE-FOO, or QUANG-DUK, or PHU-THUA-THIEN, or SAN HUÉ: capital of Anam, on the Gulf of Tonquin, in the prefecture of Thua Thuan; 16° 30′ n. lat., 107° 12′ e. long., 10 m. from the mouth of the Hue river. It is built almost in the European style. Under the reign of King Cia-lung (1801–20), it was strongly fortified by French officers, to whom, with a French bishop, that monarch was indebted for his throne. It is accessible only to vessels of the smallest class, owing to the shallowness of the small river on which it is situated. Pop. including suburbs within a radius of 2½ m., nearly 60,000.

HUELVA, *wĕl'vâ:* maritime town in s. Spain, cap. of the province of H., which was formed out of a portion of the ancient kingdom of Seville (q.v.); at the confluence of the Odiel and the Tinto, 63 m. w.s.w. of Seville, with which it is connected by railway. Its trade with Portugal and Cadiz is considerable, and it carries on an extensive tunny-fishery; but its chief commercial importance is from the copper mines. Pop. (1877) 13,174.

The *province* of H. is a mountainous region bordering on Portugal and the ocean: it has 4,197 sq. m. Pop. 210,641.

HUERTA, *wĕr'tâ*, VICENTE GARCIA DE LA: Spanish poet and critic: 1729–1797, Mar. 12; b. Zafra, Estremadura. He spent the greater part of his life in Madrid, where he held the office of principal librarian of the Royal Library, and where he died. His tragedy of *Raquel*, founded on the story of the love of King Alfonso VIII. for the fair Jewess Rachel, and its tragical catastrophe, was received with great enthusiasm 1778, and is still esteemed one of the best of modern Spanish tragedies. H. was a most zealous but not always a wise or skilful defender of the ancient Spanish national taste against the Gallicism which then prevailed. As a lyric and dramatic poet, he shows great command of language and versification. His poems were published in two vols. (*Obras Poeticas*, Madrid 1778–9). H. edited the *Teatro Español* (17 vols. Madrid 1785–6), a collection of the best works of the older Spanish dramatists.

HUESCA, *wĕs'kâ* (*Osca* of the Romans): very old and picturesque town of Spain, cap. of the modern province of H. (see ARAGON). It is surrounded by old walls once surmounted by 99 towers, only two of which remain, and is in a plain covered with vineyards, on the right bank of the Isuela, 50 m. n.e. of Saragossa. Among its chief buildings are the cathedral, built 1400, a beautiful edifice; the univ., founded 1354 by Pedro IV.; and the picturesque college of Santiago. It was once famous as a seat of learning. Tanning and manufactures of linens are carried on to some extent. Pop. 10,068.

HUESCAR, *wĕs'kâr:* small town of Spain, province of Almeria, 75 m. n.e. of Granada. The people are employed chiefly in manufacture of linen and woolen goods. Pop. reported abt. 6,000.

HUET, *ü-ā'*, PETER DANIEL: bishop of Avranches; last of the great French encyclopedists: 1630, Feb. 8—1721; b. Caen. His father had been converted from Calvinism, but died while H. was still very young. H., who was brought up by his aunt, was educated in the Jesuit school of Caen, and made extraordinary progress in almost every department of learning. He was a zealous pupil of Descartes and of Bochart—the latter of whom he accompanied on his visit to Stockholm 1652, when he discovered and transcribed the MS. of Origen, the basis of his celebrated edition of that father. On his return to Caen, he gave himself up entirely to study; and as a preliminary to his translation of the text of Origen, he published, 1664, his well-known essay *De Interpretatione;* but it was only at the end of 15 years' study that he published his edition of Origen's *Commentaria in Sac. Scripturam*, 2 vols. fol. (Rouen 1668), with a most learned introduction, entitled *Origeniana*, since reprinted in the great Benedictine edition of that father. In 1670, H. received the degree of doctor of law; and soon afterward was summoned to Paris, to take part, with Bossuet, in the education of the dauphin. In 1679, he published *Demonstratio Evangelica*. In 1676, he entered into holy orders; and 1678, was named abbot of the Cistercian abbey of Aunay, from which place is named his well-known work, *Quæstiones Alnetanæ de Concordia Rationis et Fidei* (1690). About the same time he published a work *On the Site of the Terrestrial Paradise*, another *On the Voyages of Solomon*, followed later by *History of the Commerce and Navigation of the Ancients*. In 1685, he was named Bishop of Soissons, a dignity, however, on which he never entered, being transferred to the see of Avranches 1692. He was as zealous in the discharge of his episcopal duties as he had been in his devotion to literature; but his health having given way, he obtained permission to resign his see 1699, and retired to the abbey of Fontenay, near Caen; but 1701, he took up his residence in the Jesuits' house in Paris, and published, 1718, his autobiographical memoirs—a model of pure Latinity as well as an interesting record of the history of his time. His works were published 1712, and a vol. of *Huetiana* appeared 1722.

HUFELAND, *hô'fĕh-lânt*, CHRISTOPH WILHELM: 1762, Aug. 12—1836, Aug. 25: b. Langensalza, in Thuringia: one of the most distinguished physicians of modern times. After having completed a general and medical education at the best schools in Germany, he was appointed physician in ordinary at the court of Weimar, where his father and his grandfather had previously filled the same office. Retaining this honorary title, he removed 1793 to Jena, to be ordinary prof. of medicine there; and he went from Jena to Berlin 1798 with a number of very honorable professional appointments. On the foundation of the Univ.

of Berlin 1809, he became one of its professors. He had a very high reputation for skill and tenderness as a physician, and he was held in high esteem for his character. His published works are numerous, chiefly on medical and physiolgoical subjects. His *Makrobiotik*, or Art of Prolonging Life, originally published 1796, was translated into almost all the languages of Europe. Translations exist in Servian, Hungarian, and Hebrew. His most elaborate work is the *System of Practical Medicine*, 1837.

HUFF, n. *hŭf* [imitative of the sound of puffing up or swelling with wind, as a person in a fit of passion: Ger. *hauchen*, to breathe or blow: Pol. *chuch*, I huff you—from *chuchac*, to blow]: a puff.up; sudden offense taken; a swell of sudden anger; a boaster: V. to blow or puff up; to offend; to swell or enlarge; to bluster; to blow, or remove a man from the board, as at draughts. **HUFF'ING**, imp. **HUFFED**, pp. *hŭft*, angry; offended. **HUFF'Y**, a. *-ĭ*, petulant; being in ill-humor. **HUFF'INESS**, n. *-ĭ-nĕs*, state of being puffed up; petulance. **HUFF'ISH**, a. somewhat huffy; petulant; arrogant. **HUFF'ISHLY**, ad. *-lĭ*. **TO HUFF UP**, to puff up; to swell with wind. **TO TAKE HUFF**, to take offense. **TO GIVE ONE A HUFF**, to speak like an angry man to one.

HUG, n. *hŭg* [Dut. *huggeren;* Low Ger. *huddern*, to chill, to shiver—from the int. *ugh!* expressing a shudder of cold—cold affecting the frame so as to make a person crouch together, and bring his arms and elbows to press on his sides and breast: O.Dut. *huycken;* Ger. *höcken*, to crouch or squat]: a close embrace; a particular gripe in wrestling: V. to embrace closely; to gripe in wrestling; to keep close to, as to the wind, or the shore, in sailing: see **CLOSE-HAULED**, under **CLOSE**. **HUG'GING**, imp. **HUGGED**, pp. *hŭgd*. **TO HUG ONE'S SELF**, to applaud or congratulate one's self on some supposed advantage or superiority.

HUG, *hûg*, **JOHANN LEONARD**: 1765, June 1—1846, Mar. 11; b. Constance. H. studied at Freiburg, and 1789 entered priest's orders. In 1791, he was appointed prof. of Oriental languages, and of the Old Testament, to which was added, 1792, the professorship of the New Testament. These positions H. held more than half a century, with the exception of brief occasional visits to the great libraries of Munich, Vienna, Paris, Milan, Rome, and Naples. The most important fruit of his biblical researches was his *Introduction to the New Testament* (2 vols. 1808), translated into most of the European languages. His works, in Latin and German, are chiefly in the department of biblical criticism, as *On the Age of the Vatican MS.* (1810), *On the Canticle of Canticles* (1813, and again 1818), *On the Indissolubility of Marriage* (1816), *On the Alexandrian Version* (1818), *Re-examination of Strauss's Life of Jesus* (2 vols. 1835).

HUGE, a. *hūj* [Icel. *ugga*, to fear: Scot. *ug;* OE. *houge*, to feel horror at: Bret. *heug*, aversion (see **UGLY**)]: very large or great; enormous—applied to *bulk*, not to *space* or *distance;* immense. **HUGE'LY**, ad. *-lĭ*, enormously; very great; very much. **HUGE'NESS**, n. enormous bulk or largeness. *Note.*—Skeat derives this word from OF. *ahuge*, huge, vast.—SYN. of 'huge': vast; prodigious; gigantic; colossal; immense; monstrous.

HÜGEL, *hü'gĕl*, KARL ALEXANDER ANSELM, Baron: 1796, April 25—1870, June 2; b. Ratisbon, Germany: diplomate and scientist. He studied law at Heidelberg Univ. 1811, served in the Austrian army as an officer 1813-14, was a member of the embassy appointed to secure the resignation of King Christian of Norway, went to Naples on a diplomatic mission 1821, retired to Vienna to apply himself wholly to scientific study 1824, travelled through Greece, Asia Minor, Egypt, Barbary, India, and Central Asia, and made exceedingly valuable collections in ethnography and natural science, coins, MSS., jewelry, and paintings 1831-37, and published *Botanisches Archiv* (Vienna 1837), *Kaschmir und das Reich der Sikhs*, 4 vols. (Stuttgart 1840-42), and *Das Becken von Kabul*, 2 vols. (Vienna 1851-2). His collections were purchased by the Austrian govt. for the Vienna Museum.

HUGER, *yô-jē*, ISAAC: 1742, Mar. 19—1797, Oct. 17; b. Limerick Plantation, S. C.: soldier. He was educated in Europe, served as lieut. in the Cherokee Indian war 1760, was appointed lieut.col. of the 1st S. C. regt. early in the revolutionary war, promoted col. of the 5th S. C. regt. 1776, brig.genl. U.S.A. 1779, Jan. 9; was wounded while leading his brigade at the battle of Stono 1779, June 20; led the Ga. and S. C. militia in the unsuccessful attack on Savannah, was defeated by Tarleton at Monk's Corner, S. C.; was again wounded at Guilford Court-House, and commanded the right wing of the army at Hobkirk's Hill. His nephew, FRANCIS KINLOCK H. (1764-1855, b. S. C.) studied medicine, and was an officer in the revolutionary war; and served in the war of 1812 with England. He was engaged in an attempt to release Marquis de Lafayette from his prison at Olmutz.

HUGGER-MUGGER, a. *hŭg'gėr-mŭg'gėr*, or HUDGE-MUDGE, a. *hŭj'-mŭj'*, and HODER-MODER, a. *hŏd'ėr-mŏd'ėr* [Ger. *mucken*, to mutter: Swiss, *muckeln*, to speak secretly of a thing: Norw. *mugg*, secrecy: Sw. *i mjugg*, clandestinely: Dan. *i smug*, secretly]: secret; clandestine; confused; disorderly; now generally applied to a mean or unsuitable way of living: V. to talk aside and in a low tone: AD. privately; clandestinely: N. aside talk in a low tone; confusion. -MUG'GERING, imp. -MUG'GERED, pp. *-gėrd:* see CURMUDGEON.

HUGGINS, *hŭg'ĭnz*, WILLIAM, D.C.L., LL.D: astronomer: b. London, 1824, Feb. 7. He was educated at the London City School, studied privately mathematics, classics, and modern languages, educated himself in the physical sciences and astronomy, was elected a member of the Microscopical Soc. 1852, studied with the microscope animal and vegetable physiology, established a private astronomical observatory at his residence 1855, and since 1862 has given nearly all his attention to spectroscopic observations of the various heavenly bodies. He was elected a fellow of the

Royal Soc. 1865, received the royal medal for scientific researches 1866, and with Dr. Miller the gold medal of the Royal Astronomical Soc. for their joint researches 1867. Since 1875 he has been engaged in obtaining photographs of the ultra-violet portions of the spectra of the stars. He was pres. of the Royal Astronomical Soc. 1876–78, and received the degree LL.D. from Cambridge Univ. 1870, and Edinburgh Univ. 1871, D.C.L. from Oxford Univ. 1870, and Doctor of Physics and Mathematics from the Univ. of Leyden 1875. He is a member of many astronomical and scientific societies.

HUGH CAPET: see CAPETIAN DYNASTY.

HUGHES, *hūz*, **BALL**: 1804, Jan. 19—1868, Mar. 5; b. London, England: sculptor. He studied sculpture with Edward H. Bailey, won a number of prizes offered by the Royal Acad. while a student, executed busts of George IV. and the Dukes of York, Sussex, and Cambridge; removed to the United States 1829, and made the marble statue of Alexander Hamilton for the Merchants' Exchange of New York; the high relief of Bp. Hobart in Trinity Church, New York; casts of *Little Nell* and *Uncle Toby* in the Boston Athenæum; bronze statue of Nathaniel Bowditch in Mt. Auburn cemetery (near Boston); a *Crucifixion*; statuette of Gen. Warren; and a model for an equestrian statue of Washington.

HUGHES, JOHN, D.D.: 1797, June 24—1864, Jan. 3; b. Annaboghan, co. Tyrone, Ireland: Rom. Cath. archbishop of New York. He came to America 1817, worked as a gardener and nurseryman, was educated at Mt. St. Mary's College, Emmettsburg, ordained deacon 1825, priest 1826, coadjutor to Bp. Dubois of New York 1838, bp. of New York 1842, and abp. 1850. He founded St. John's Asylum in Philadelphia 1829, established *The Catholic Herald* 1833, founded St. John's College in Fordham, N. Y., 1839; was a secret diplomatic agent of the U. S. govt. to France 1861–62; and aided the authorities in checking violence during the native American riots 1844, and the draft riots 1863. A wish for his elevation to the cardinalate was signified to the pope from this country 1852 and 61—not (it is said) without governmental approval.

HUGHES, *hūz*, **THOMAS**: English author and politician: second son of John H., of Donington Priory, Newbury, Berkshire: b. Uffington, Berks, 1823. He was educated at Rugby under the celebrated Dr. Arnold; entered Oriel College, Oxford, 1841, and took his degree B.A. 1845; was called to the bar at Lincoln's Inn 1848, and became a member of the Chancery Bar. In 1856, he gave to the world *Tom Brown's School-days*—a picture of life at a public school, evidently written from the author's own personal experience, and recording the vivid and enduring impressions that he brought with him from Rugby. This work attained great popularity in England and America, especially among the young. It was followed, 1858, by *The Scouring of the White Horse;* 1861, by *Tom Brown at Oxford*, in which the mental history of his hero is continued, with sketches of college life and incidents; and 1869, by *Alfred the Great.* H. pursued meanwhile the study and practice of the law. He gained the confidence of the working classes by endeavoring to promote a better understanding between masters and men, and by teaching the latter the value of co-operation as a means of social elevation. He has, however, never failed courageously to rebuke the narrow prejudices and mischievous views held by certain members of trades-unions. At the general election for Lambeth 1865, he was placed at the head of the poll. He was returned for Frome 1868, which he continued to represent till 1874, and always was prominent in debates relating to the combinations of trades-unions, and the law of master and servant. He was appointed queen's counsel 1869. In 1880, he assisted in founding on the Cumberland plateau in Tenn., a settlement or colony, of which he published an account under the title of *Rugby, Tennessee* (1881): see RUGBY (Tenn.). He has also written the *Life of Daniel Macmillan* (1882).

HUGO, *hū'gō*, F. *ü-go'*, VICTOR MARIE, Vicomte: foremost French author and one of the greatest poets of his time: 1802, Feb. 26—1885, May 22; b. Besançon, where his father was then commandant of the garrison. (See *V. Hugo and His Times*, by Barbou, translated by Frewer 1882.). His mother was a native of La Vendée, and from her he imbibed romantic royalist sentiments, though his father was a devoted follower of Napoleon. His youth was spent partly with his mother in Paris, partly in Italy and Spain, where his father held high appointments. He early acquired distinction by his poetic effusions; and before he was 30 years of age, his published works were numerous, and his name famous. Odes and ballads, romances, dramas, etc., flowed from his prolific pen. Shortly before the revolution of 1830, a literary revolution took place, at the head of which was Hugo. A band of young men, imaginative, ardent, and confident, sought to renovate French literature, by departing from classic rules and models, substituting a varied and very irregular verse for the monotonous Alexandrines of the old school, and making art precisely conform to nature, which they carried so far as even to bring into prominence things disagreeable, which nature herself is displeased with, and teaches us to keep out of sight. The new school, *la jeune France*, as they called themselves, formed the *Romanticists*, and their opponents were the *Classicists*. The The literary war lasted several years. H.'s drama of *Marion Delorme* was received with enthusiasm; and he added to his reputation by the publication of *Feuilles d'Automne.* In 1832, the ministry suspended one of his dramas, *Le Roi s'amuse;* but his popularity continued to increase, and 1837 Louis Philippe made him an officer of the Legion of Honor, and 1845 a peer of France. After the revolution of 1848, he was elected to represent Paris, both in the constituent and in the legislative assembly, in which he manifested democratic principles, and was one of the members of the extreme left who were banished from France for life by Louis Napoleon. He went to reside in the island of Jersey. In 1852, he assailed the ruler of France in a political pamphlet, *Napoleon le Petit;* and next year, in *Les Châtiments*, a series of poems written with great *verve*, in the same spirit. In 1856, he published his *Contemplations*. He refused to avail himself of the amnesty of 1859, Aug. 15; but on the fall of the empire, hastened back to his native country, joined in the republican movement, and was returned to the national assembly at Bordeaux, which, however, he soon quitted in disgust. He then went to Brussels, but the Belgian government expelled him from the country, and he had to seek refuge in Vianden, a village of Luxemburg, where *L'Année Terrible* was composed. Returning to Paris 1871, July, he pleaded earnestly, but without effect, for the lives of the Communists. H. gave an account of his life in *Actes et Paroles* (1870–72). In 1862 appeared *Les Misérables; L'Homme qui Rit* (1869); *Quatrevingt-treize* (1874); his *Speeches* (1875); *Légende des Siècles* (1877); *L'Histoire d'un Crime* (1878); the didatic poems, *Le Pape* (1878), *Religions et Religion* (1880); *L'Ane* (1880); *Les Quatre Vents de l'Esprit* (1881). H. was a member of the French senate. (See *A Study of H.*, by Swinburne 1886.) The popular demonstrations in 1881 on occasion of H. entering his 80th year were sufficiently zealous and universal to recall the enthusiasm of Voltaire's last reception in Paris. H.'s prose and verse, the latest as well as the earlier, is powerful, vivid, and brilliant; he had great wealth of imagination and command of dramatic effect. His lyrics are unequalled. But his work is marred by frequent extravagance both in thought and diction.

HUGUENOT, n. *hū'gĕ-nŏt* or *-nō* [possibly a corruption of *Eidgenossen*, the Swiss confederates—Geneva being the headquarters of Protestantism]: name applied to the Protestants of France in the 16th and 17th c. *Huguenot* has been discovered by Littré to have been a proper name in France at least two centuries before the Reformation, and may be nothing more than the Christian name of a conspicuous supporter of the sect in early times, applied in contempt, as usually is the case, to the whole sect. *Huguenot* may be a dim. of F. *Hugues*, Hugh.—This etymology may be more probable than the one first given, though the word appears to have originated in the usual popular corruption and accommodation. HU'GUENOTISM, n. *-ĭzm*, tenets of the Huguenots, *-nŏts* or *nōz*.—One of the most eminent names in the early history of French Protestantism is that of Farel (q.v.), and one of the first supporters of its cause was Margaret of Valois, queen of Navarre, and sister of Francis I. Subsequently, in the time of Calvin, many of the nobles and middle classes embraced the reformed religion. Francis I., however, opposed it with great severity, and caused many to be burned as heretics. The alliance of Henry II. with the German Protestants gave at first an impulse to the Reformation, but the aspect changed when the family of Guise obtained the ascendency at court. Under Francis II. a chamber (*chambre ardente*) was established in each parliament for the punishment of Protestants; and executions, confiscations, and banishments were common in all parts of the kingdom. The Protestants under these oppressions took up arms against the government, choosing Louis I., Prince of Bourbon-Condé, for their leader. 1560, Feb. 1, in a meeting at Nantes, they resolved to petition the king for freedom of religion, and for the removal of the Guises; and in the event of his refusal, to seize the king's person, and proclaim Condé gov.gen. of the kingdom. But the court, being apprised of the conspiracy, fled from Blois to Amboise, and the Duke of Guise was appointed gov.general. Some bands of Protestants, approaching Amboise with weapons in their hands, were easily defeated and taken; 1200 died by the hand of the executioner. The Edict of Romorantin, 1560, May, took the prosecution of heretics out of the hands of the parliament, and gave it into those of the bishops. By the Assembly of Notables in Aug., it was resolved that the whole matter of religion should rest until the next assembly of the states. While the Guises plotted the death of the Prot. leaders, Charles IX. ascended the throne, a prince not yet of age; and the queen-mother, Catharine de' Medici (q.v.), having removed the Guises from the helm of the state, was compelled to seek the support of the Protestants against them and their party. In 1561, July, appeared an edict which freed the H. from the penalty of death. For the complete termination of strife, the court opened a religious conference at Poissy Sep. 3. The chief disputants were the Cardinal of Lorraine on one side, and Theodore Beza on the other. The effect of the discussion was to unite and embolden the Protestants, with whom the machinations of the Guises forced Catharine into closer alliance. 1562, Jan. 17, appeared an edict, giving noblemen the right of the free exercise of their religion on their own estates.

The Guises and their partisans became exasperated. 1562, Mar. 1, a company of Protestants met in a barn at Vassy for religious exercises, was attacked, and many of them were massacred by the followers of the Duke of Guise. On this, Condé hastened to Orleans, and called his co-religionists again to his standard; while the Guises took possession of the persons of the king and his mother, and proclaimed the Protestants rebels. 1562, Sep. 11, the royal troops, after much bloodshed, took Rouen, and Dec. 19 a battle was fought at Dreux, in which, after a hard struggle, the Protestants were defeated. The Duke of Guise marched on Orleans, but was assassinated in his camp before that city, 1563, Feb. 18. Hereupon the queen mother hastened to conclude the peace of Amboise Mar. 19, by which the Protestants were allowed the free exercise of their religion, except in certain districts and towns. Catharine, however, hated the new faith, and formed a close alliance with the Spaniards for the extirpation of heresy, retrenched the new liberties of the Protestants, and made attempts upon the liberty and the life of Condé and of the Admiral Coligny (q.v.). These leaders of the Protestant party adopted the resolution of taking possession of the king's person. The court fled to Paris, which Condé invested; but 1567, Nov. 10, a battle was fought at St. Denis between Condé and a much superior force under the Constable Montmorency (q.v.), in consequence of which Condé fell back into Lorraine, where he effected a junction with an auxiliary force of 10,000 men from Germany, under Prince John Casimir. After this, he again threatened Paris; whereupon Catharine concluded peace at Longjumeau 1568, Mar. 27, reestablishing the terms of the treaty of Amboise. Nevertheless, she proceeded to persecute the Protestants, of whom 3,000 were assassinated or executed. The Protestants having, however, received assistance in troops from Germany, and in money and artillery from England, began the third religious war. But 1569, Mar. 13, they were defeated, and Condé their leader slain, at Jarnac by the royal troops under the Duke of Anjou, afterward Henry III. These misfortunes greatly dispirited the Protestants. Jeanne d'Albret, queen of Navarre, endeavored to reanimate them in an assembly at Cognac, and set up her son, afterward Henry IV., as the head of the Prot. cause. Coligny became their military leader, and having received further assistance of troops from Germany, he laid siege to Poitiers, but was again defeated by the Duke of Anjou at Moncontour, Oct. 3. Fresh reinforcements from England, Switzerland, and Germany, enabled Coligny to take Nîmes 1569, and to relieve Rochelle, while Lanoue obtained a victory over the royal troops at Luçon. Catharine and her son now sought for peace, to which the Protestants, weary of the hard contest, consented. The treaty, concluded at St. Germain-en-Laye 1570, Aug. 8, gave to the Protestants an amnesty, the free exercise of their religion everywhere, except in Paris, and the possession of a number of places of security.

Catharine, having failed to overthrow the Protestant cause in the open field, sought to accomplish her object by treachery, and by a general massacre of Protestants on St. Bartholomew's Day (q.v.) 1572. Although deprived of their leaders, and weakened by the slaughter of great numbers of their best and bravest, the Protestants flew to arms. The Duke of Anjou, after having lost his army before Rochelle, took advantage of his election to the throne of Poland, and 1573, June 24, concluded a peace by which the Protestants obtained the free exercise of their religion in their places of security, Montauban, Nîmes, and Rochelle, and a certain concession of liberty of conscience. A section of the Rom. Cath. nobility, at whose head was the Duke of Alençon, youngest son of Catharine, from purely political motives, united with the Protestants in opposition to the government of the queen-mother and the Guises. Catharine, therefore, incited her third son, Henry III., who had now succeeded to the throne, immediately to recommence hostilities against the Protestants. But, contrary to all expectation, the Protestant cause was highly prosperous during 1575. A peace was concluded at Beaulieu May 8, by which the Protestants were freed from all restrictions in the exercise of their religion, and obtained a number of places of security. The king also paid their German auxillaries. The Duke of Guise, thus frustrated in his political designs, originated a Rom. Cath. association, called the Holy League, at the head of which the king put himself in the Assembly of the States at Blois, 1576, Nov. 6; and then the sixth religious war began. Peace was, however, again concluded by the king himself at Bergerac, 1577, Sep., on the former conditions; and Catharine, to diminish the power of the Duke of Guise, entered into a private treaty with Henry of Navarre at Nerac, by which several places of security were made over to the Protestants. The terms of peace being violated by the court, Henry I., Prince of Condé, son of Louis I., and, like his father, a leader of the Prot. party, commenced the seventh religious war (called the *guerre des amoureux*) 1579, Nov., by the occupation of Lafère, and Henry of Navarre, 1580, April, took Cahors. But Condé, having been driven out of Lafère by Matignon, and Henry of Navarre vanquished at Mont-Crabel by Biron, peace was concluded at Fleix, 1580, Nov.

There was now a comparatively long interval of repose till 1584, when, by the death of the Duke of Anjou (formerly of Alençon), Henry of Navarre became heir to the throne of France. Hereupon Henry, Duke of Guise, exerted himself for the revival of the League, entered into an alliance with Spain and the Pope for the extirpation of heresy, declared the Cardinal of Bourbon heir to the throne, and began hostilities against the Protestants. This war is commonly known as the 'war of the three Henries.' The king soon made terms with him, and declared all the privileges of the Protestants forfeited. The Protestants, having obtained troops from Germany and money from England, entered on the eighth religious war, which was prosecuted with various success, Henry of Navarre commanding the Prot. army. The Duke of Guise, in the midst of these troubles, grasped the whole power of the state. But his designs with regard to the throne having become very evident, the king caused him and his brother the cardinal to be assassinated at the Assembly of the States at Blois, 1588, Sep. In less than a year, the king was himself assassinated by a monk named Jacques Clement, and Henry of Navarre succeeded to the throne, and signed the famous EDICT OF NANTES (see NANTES), 1598, Apr. 13, by which the rights of the Protestants were established and enlarged. About 1590, the H. exercised their worship in abt. 3,500 chateaux, and in abt. 200 towns or bourgs, mostly in the south and west of France.

Under the reign of Henry IV., whose great minister, Sully, was himself a Protestant, the Protestants lived in tranquillity. But when, during the minority of Louis XIII., Mary de' Medici, the queen of Henry IV., assumed the reins of government, the independence which the Protestants enjoyed stood too plainly in the way of a court bent upon absolutism. The king, indeed, took an oath, 1614, to maintain the Edict of Nantes, but the marriage treaties with the Spanish court excited the apprehensions of the Protestants to such a degree that, 1615, Nov., they made common cause with the Prince of Condé, who had then set up the standard of rebellion. This they did contrary to the advice of the most sagacious of their own party. Although by the treaty of Loudun, 1616, May 4, they obtained a new confirmation of their freedom of worship, the court now waited only for an opportunity of breaking at least their political power. In 1617, June, a royal edict commanded the entire suppression at once of the Prot. Church, and of political privileges, in the province of Beárn; but the provincial court at Pau refused to register the edict, and the matter lay over till 1620, when, at the instigation of the Jesuits, and of his favorite, De Luynes, the king carried the edict into full effect by force of arms. The Protestants throughout all France took alarm, and hostilities again broke out, 1621, May. At the head of the Protestants were the two brothers, the Duke of Rohan and the Prince Soubise. Their cause, however, was feebly maintained; almost all the Protestant towns fell into the hands of the king, force, stratagem, and bribery being equally employed. At last, after the capitulation of Montpellier, 1622, Oct. 21, there followed a general peace, by which the Edict of Nantes was confirmed, but the right of prohibiting the assemblies of the Protestants was assumed on the part of the crown. The court, however, paid little attention to the stipulations of the treaty, and when the government was involved in difficulties in Italy, the Protestants took the opportunity again to rise in arms. Soubise, with a fleet furnished by the town of Rochelle, oftener than once defeated the weak royal navy. Cardinal Richelieu (q.v.), who was now at the helm of affairs, found himself under the necessity of making offers of pacification, which were rejected. Hereupon the cardinal resolved on the capture of Rochelle, the most important stronghold of the Protestants. This he accomplished after a heroic resistance by the inhabitants, 1627–8. The fall of Rochelle was speedily followed by that of Nîmes, Montauban, Castres, and all the other Protestant strongholds. Now left defenseless, the Protestants were entirely dependent on the will of the court, which, however, made no attempt to deprive them of their liberty of conscience. At the accession of Louis XIII. they had abt. 500 churches; which had increased in 1628 to 688, and in 1637 to 720. It was Louis XIV., when he became superstitious in his old age, who, at the instigation of Madame de Maintenon and his confessor Lachaise, commenced anew the persecution of the Protestants. He gradually deprived them of their equal civil rights, and endeavored to put down the Prot. Church altogether. Bodies of troops, accompanied by monks, passed through the southern provinces, compelling the inhabitants to renounce their religion, demolishing the places of worship, and putting to death the preachers. Hundreds of thousands of Protestants fled to Switzerland, the Netherlands, England, and Germany. In vain was it attempted to restrain this self-expatriation by cordons along the borders. Many Protestants also made an insincere profession of Rom. Catholicism. These, on the slightest appearance of relapse, were put to death. Between 1657 and 85, 520 churches (according to Anquetil 700) were destroyed. At last, 1685, Oct. 23, Louis revoked the Edict of Nantes. (See Rulhière, *Eclaircissements Historiques sur les Causes de la Révocation de l'édit de Nantes*, 2 vols. Paris, 1788.) Hereupon began a new flight, followed by a still more fearful persecution of the Protestants. Their marriages were declared null; their children deprived of the right of inheritance, and forcibly shut up in convents; their preachers indiscriminately put to death. From the vicinity of Nîmes, where they had always been very numerous, thousands betook themselves to the mountains of the Cevennes, and continued the exercise of their religion in secret. Among these and the mountaineers of the Cevennes, a remarkable fanatical enthusiasm displayed itself, and, under the name of Camisards, they maintained for a number of years a wonderfully successful opposition to the forces of the great monarchy. The *War of the Cevennes*, or *Camisard War* (see CEVENNES: CAMISARDS), was not terminated until 1706, the suppression of the local rebellion being attended with circumstances of great cruelty. France had lost by this time more than a million of her most active, enterprising, and industrious citizens; and, notwithstanding all the persecutions, about two millions continued to adhere to the Prot. religion.

The partial repose which the Protestants enjoyed for more than ten years was attended by a revival of their worship, especially in Provence and Dauphiné. In 1724, therefore, Louis XV., at the instigation of the Jesuits, issued a severe edict against them. The spirit of the age, however, now began to be opposed to persecution. An edict of 1752 declared marriages and baptisms by Prot. ministers to be null, and required the repetition of them by the Rom. Cath. clergy. But when, upon this, many began again to flee from their country, the disgust of the Rom. Catholics themselves was so much excited, that the court recalled the edict. Montesquieu successfully advocated the cause of toleration; Voltaire did much to promote it by his exposure of the judicial murder of John Calas (q.v.). At last by an edict 1787, which indeed was not registered by the parliament till 1789, Louis XVI. declared the Prot. marriages and baptisms valid, and restored to the Protestants equal civil rights, except that they might not be advanced to public offices and dignities. Even in 1789, a proposal for the complete emancipation of the Protestants was rejected by the national assembly, which, however, admitted Protestants, and even Prot. preachers as members without objection; and in 1790, it passed a decree for the restitution of all the properties of those not conforming to the Rom. Cath. Church which had been confiscated since the time of Louis XIV. The *Code Napoleon* gave Protestants in France equal civil and political rights with Rom. Catholics. The charter granted by the Bourbons acknowledged the freedom of Prot. worship, and the state pledged itself for the maintenance of the pastors; yet, under the government of the Restoration, the privileges of Protestants were in many ways circumscribed. After the revolution of 1830, July, the Reformed Charter of France proclaimed universal freedom of conscience and of worship, which principle has been maintained in subsequent changes. Protestants are not now subjected to many exceptional hardships, and have in various important instances been protected by the imperial authority from the arbitrary exercise of power attempted by illiberal local magistrates adverse to their religion. But the *recognized* Prot. Church—in which are included both *Reformed* and *Lutherans*, and of which the pastors receive small salaries from the state (see FRANCE)—was not till 1872 permitted to hold synods or general assemblies; at a synod in that year the conservative party in the church, in spite of some opposition. carried their proposal that the church, which had long been without a formally binding creed, should adopt an evangelical confession. There were, a few years since, abt. 500,000 Calvinists in France, of which abt. one-fifth were in the north. In recent years there has been in Paris and several other large cities a great increase of Protestantism. See MCALL MISSION. See Félice, *Hist. des Protestants en France* (1851); Haag, *La France Protestante* (1859); Smiles, *The H. in England;* Baird's *Rise of the H.* (1880).

HUILE DE CADE, *ü-ĕl dĕh kâd:* brownish, inflammable, oily liquid, obtained by the dry distillation of the wood of *Juniperus Oxycedrus.* It has a strong odor of tar, and an acrid, caustic taste. It is used externally in veterinary medicine, also for the human subject. It is a good local remedy in toothache. It has been given internally in worms, but is dangerous and uncertain.

HULDA, *hŭl'dâ*, or HOLDA, *hōl'dâ* or *hŏl'dâ* ('the friendly, the benignant'), well known in old German legends and traditions as *Frau Holle:* originally a goddess of marriage and fecundity. Worshipped and invoked by maids and wives, to the former she sent bridegrooms, to the latter, children; great numbers of whom were believed to surround her in her favorite haunts in the depths of the sea, or the hearts of hills. She was also the patroness of agriculture and domestic life, with its manifold employments. Sometimes she was regarded as a celestial being, and anciently the people used to say when the snow fell: 'Hulda is making her bed.'

HULK, n. *hŭlk* [mid. L. *hulka*, a heavy merchant ship: F. *hourque*, a large fly-boat, a hulk: Norw. *holk*, a tub: Flem. *durk*, the place in a ship where the foul water collects]: a large ship of clumsy make; the body of a ship—generally said of an old ship unfit for service, and used in harbor as a depot of some sort; anything bulky or unwieldy, as a hulk of a fellow; in *mining*, an old excavated working. HULKY, a. *hŭlk'ĭ*, large; extra-sized. THE HULKS, old or dismasted ships, formerly used as prisons for convicts. A GREAT HULKING FELLOW, a large, overgrown, and lazy man.

HULL, n. *hŭl* [AS. *hulu*, a husk: Dut. *hullen*, to put a mask on: Dan. *hylle*, to wrap: Ger. *hülle*, a clothing, a veil]: the outer covering of anything, as of a nut or grain; in *Scot.*, the shell of a bean, or a pea-pod: V. to husk or shell; to take off the outer covering or husk. HULL'ING, imp. HULLED, pp. *hŭld*. HULL'Y, a. -*ĭ*, having husks or pods.

HULL, n. *hŭl* [Dut. *hol*, hollow: F. *houle*, the waves or rolling of the sea (see HOLD 2, and HULL 1)]: *literally*, the hollow husk or shell which floats; the body of a ship, exclusive of masts and rigging: V. to pierce the body of a ship with shot. HULL'ING, imp. HULLED, pp. *hŭld*.

HULL, v. *hŭl* [F. *houle*, the waves or rolling of the sea: Dut. *holle*, a hollow or agitated sea]: in *OE.*, to float about, as a ship when the sails are taken down; to float; to float to and fro helplessly, as a ship without sails or rudder. HULL'ING, imp. HULLED, pp. *hŭld*. TO LIE A HULL, to lie tossing to and fro upon the sea, as a sailing-vessel in a calm, or helplessly without sails or rudder. HULL DOWN, said of a ship when the masts and sails only are seen above the horizon.

HULL, *hŭl*, ISAAC: 1775, Mar. 9—1843, Feb. 13; b. Derby, Conn.: naval officer. He was nephew of Gen. William H., by whom he was adopted after his father's death. Declining a proffered course at Yale College, he went to sea when 14 years old, was master of a merchantman in the London trade when 19, and was appointed lieut. in the U. S. navy when 25. In 1801 he was assigned to the frigate *Constitution*, 1804 promoted master-commanding, and 1806 capt., and was on constant duty as capt. and commodore 37 years. During this period he distinguished himself in the Barbary expeditions, and the war of 1812 between the United States and Great Britain. In the *Constitution* he escaped from a British squadron of 5 vessels in a three days' pursuit, July; and fought, captured, and burned the British frigate *Guerriere* Aug. 19. For the latter achievement congress voted him a gold medal and his officers and crew $50,000 as prize-money.

HULL, *hŭl*, or KINGSTON-ON-HULL, *kĭngz'ton-ŏn-hŭl*: important and flourishing English river-port, a parliamentary and municipal borough and county of itself; in the East Riding of Yorkshire, in a low, level plain on the n. bank of the Humber, at the confluence of the Hull with that river, 53 m. e.s.e. of York. Of the ecclesiastical edifices the most notable are the Church of the Holy Trinity, a beautiful and ornate Gothic structure, the transept of which is the oldest English brick building in the country; and St. Mary's Church, Lowgate, one half of which was removed to make room for the mansion-house of Henry VIII., who occasionally resided here. The most important educational establishments are the Hull Grammar-school, and Trinity House School, where 36 boys receive a nautical education. An equestrian statue of William III. stands in the market-place, and a statue of Wilberforce. Among many other benevolent establishments, the Trinity House, instituted for relief of decayed seamen, and the Charter House, an endowed institution for the poor, are notable. A town-hall, a new exchange, and a new theatre were opened 1866.

The docks—the Old Dock, the Humber, the Junction, the Railway, and the Victoria docks—are very extensive, the last being the largest. It occupies part of the site of an old citadel with a battery of 21 guns, which, till 1864, commanded the entrance of Hull Roads and the Humber. A new dock which greatly increases the accommodation for shipping was opened 1869. H. was one of the first ports in England to engage in the whale-fishery, which it has now almost abandoned; but its fisheries for edible fish employ nearly 700 boats. H. is a principal steam-packet station, and ocean-steamers ply regularly to many principal ports of Belgium, the Netherlands, and Denmark. It is the great outlet for the woolen and cotton goods of the midland counties, with which it has direct communication, by railway, river, or canal. Many ship-building yards are in operation here, and the chief manufactures are those principally to which a flourishing port gives rise, as ropes, canvas, chain, chain-cables, machinery, etc. There are many mills of various kinds as well as chemical factories, tanneries, potteries, and sugar-refineries. Immense commercial intercourse subsists between H. and the countries of n. Europe, the principal exports being woolen and cotton manufactured goods; and the imports timber, corn, wool, iron, flax, hemp, tallow, hides, pitch, bones, and horn. In 1880, 4,671 vessels, of 1,836,004 tons, entered and cleared the port, which ranks as the third port of the United Kingdom. H. returns 3 members to parl. Pop. (1871) 123,408; (1881) 154,240.

HULL, William: 1753, June 24–1825, Nov. 29; b. Derby, Conn.: soldier. He graduated at Yale College 1772; studied divinity and law; was admitted to the bar 1775; served through the revolutionary war with distinction, and received the thanks of congress; practiced law at Newton, Mass.; was maj.gen. of Mass. militia in Shay's insurrection; gov of Mich. Terr. 1805–12; brig.gen. commanding the n.w. army 1812; surrendered Detroit to the British 1812, Aug. 16; court-martialed, declared guilty of cowardice, and sentenced to be shot 1814; pardoned by the pres.; and passed the rest of his life on his farm at Newton, Mass. His conduct at Detroit has been fully justified and the injustice of his treatment demonstrated.

HULLABALOO, n. *hŭl'lă-bă-lô'*, or **Hurly-burly**, n. *hėr'lĭ-bėr'lĭ* [F. *hurluberlu*, abruptly, with a clatter: Low Ger. *huller-de-buller*, signifying hasty in action: F. *hurler;* OF. *huller*, to howl, to yell]: words formed to represent a confused noise; the thick of battle; uproar; confusion. *Note.*—The F. *hurluberlu* was really derived from Eng. *hurly-burly;* and the Eng. *hullabaloo* is said to be a mere corruption of the French.

HULLAH, *hŭl'lah*, **John**: English composer and teacher of music: 1812, June 27—1884, Feb. 21; b. Worcester. He studied at the Royal Acad. of Music, and was the composer of Charles Dickens's operetta, *The Village Coquette*, 1836, followed by two other comic operas. In 1841, he began his great system of popular singing classes. More than 25,000 pupils passed through these classes 1840–60. He became prof. of music at important London schools, and 1874, inspector of training schools for the United Kingdom. H. had little sympathy with recent developments of modern music, and opposed the 'Tonic Sol-fa method; he was author and editor of many musical works, and published *History of Modern Music* (1862), and *The Third Period of Musical History* (1865).

HULSEAN LECTURES, ETC., *hŭls'ē-an:* institutes founded at Cambridge Univ., England, by the Rev. John Hulse, of Elworth, Cheshire (1708–89). He was educated at St. John's College, Cambridge; and bequeathed the bulk of his property to the university: the annual income from the endowment is £800 to £900. His will, containing 400 pages folio, with nine codicils, provides for founding two divinity scholarships in St. John's College, the Hulsean prize, the office of Christian Advocate (in 1860, changed into the Hulsean Professorship of Divinity), and that of Hulsean Lecturer or Christian Preacher. The first course of lectures was delivered 1820; the number was originally 20. The lecturer, appointed annually, must deliver four lectures before the university. Of the annual income eight-tenths go to the professorships; the remainder is divided between the lectureships and the prize.

HUM, n. *hŭm* [Ger. *hummen;* Dut. *hommelen*, to hum or buzz as a bee—from direct imitation: L. *bombus;* Gr. *bombos*, a humming]: the noise of bees or other insects; a low confused noise; formerly an expression of applause.

Hum, int. [Icel. *houms*, the hissing of a suppressed utterance]: a sound implying doubt and hesitation: V. to utter sounds like bees; to sing without words in a low or under tone; to utter low sounds expressive of indignation; in *OE.*, to flatter; to cajole [Port. *zumbir*, to buzz; *zombar*, to joke]. **Hum'ming**, imp. **Hummed**, pp. *hŭmd.* **Hum'mer**, n. *-mer*, one who hums; in *OE.*, an applauder. **Humble-bee**, which see. **Hums and haws**, a suppressed utterance with stammering, indicating that the person is at a loss what to say. **Humdrum**, n. what goes on in a humming, drumming, droning way: Adj. monotonous; commonplace; stupid. **Humming**, n. *hŭm'mĭng*, the sound of bees. **Humming-bird**, see below.

HUMAN, a. *hū'măn* [L. *hūmānŭs*, human—from *hŏmō*, man: F. *humain*]: of or pertaining to mankind; having the qualities or nature of man. **Hu'manly**, ad. *-lĭ*, after the manner of men. **Humanity**, n. *-măn'ĭ tĭ* [F. *humanité* —from L. *hūman'ĭtas*]: the quality of being human; the peculiar nature of man; the human race; benevolence; tenderness; mental cultivation befitting man; in *Scot. Univ.*, one of the *humanities*, viz., Latin, Greek, rhetoric, poetry, and grammatical studies, the acquisition of which is supposed to humanize or polish the mind—now restricted to the Latin language (see Humanists). **Humane**, a. *hū-mān'*, kind; tender and compassionate; having the feelings proper to man. **Humane'ly**, ad. *-lĭ*. **Hu'manize**, v. *-īz*, to soften; to render kind and tender; to make civilized. **Hu'manizing**, imp.: Adj. investing with the character of civilized man; softening. **Hu'manized**, pp. *-īzd:* Adj. invested with the character of civilized man; made humane. **Hu'maniz'er**, n. *-ėr*, one who. **Hu'maniza'tion**, n. *-ĭ-zā'shŭn*, the act of humanizing. **Hu'mankind**, the race of man; the human species. **Human'ita'rian**, n. *-tā'rĭ-ăn* (see below).

HUMANISTS, *hū'man-ĭsts* [Lat. *literæ humaniores*, polite letters—whence the title *Humanity* for the professorship of Latin in Scottish univerities]: name assumed in the beginning of the 16th c. by the party who cultivated classical literature especially, as the most valuable instrument of education, in opposition to those who clung to the ancient methods of the *Scholastics* (q.v.). Later, the name became a word of reproach for those who, in the 18th c., showed a blind zeal for the classics as the sole educational subject; opposing the Philanthropists (see **Philanthropy**), who asserted the value of mathematics, science, modern languages, and history. The name is often given to the foremost scholars from the time of the Renaissance onward, such as Hutten (q.v.), etc.

HUMANITARIANS, *hū-măn-ĭ-tā'rĭ-ans:* designation of anti-Trinitarians, who regard Christ as a mere man, and refuse to ascribe to him any supernatural character, whether of origin or of nature. The earliest assertors of the purely Humanitarian theory are Theodotus of Byzantium, and Artemon, in the 2d c.: see Unitarians. The name Humanitarians is sometimes applied also to the disciples of St. Simon, and in general to those who look to the perfectibility of human nature as their great moral and social dogma; also to those who, from over-philanthropy, object to severe legal measures, such as capital punishment, etc.—For the religion of Humanity, see POSITIVISM.

HUMATE, n. *hū'māt* [L. *humus*, the ground]: a compound of humic acid with a base.

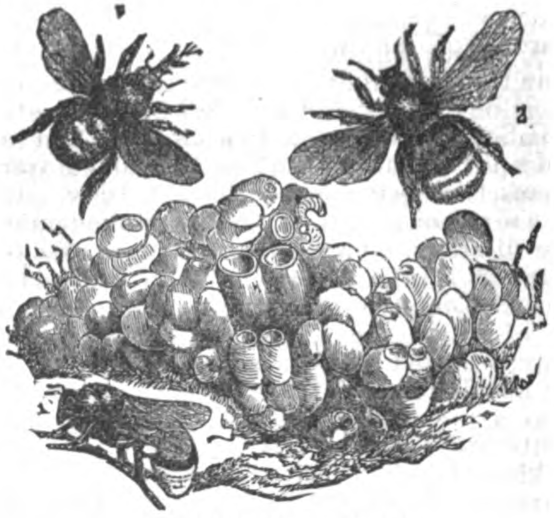
HUMBER, *hŭm'bėr*: continuation and estuary of the river Ouse (q.v.).

HUMBERT, *hŭm'bėrt*, I., King of Italy: b. 1844, Mar. 14; son of Victor Emanuel, at whose death he succeeded to the throne 1878, Jan. 9. He accompanied his father during the war of Italian independence, was active in the movement for the unification of Italy after the struggles of 1859, was conspicuous in the reorganization of the ancient kingdom of the Two Sicilies, took the field on the outbreak of hostilities between Prussia and Austria, and as lieut.gen. commanding a div. in Gen. Cialdini's army, distinguished himself at the battle of Custozza 1866, June. He married his cousin, Princess Margherita of Savoy, 1868, Apr. 22. After the outbreak of the Franco-German war 1870, France withdrew its garrison from Rome, and the Italian troops, taking immediate possession, completed the unification of the kingdom. Within a year after his ascension an attempt was made to assassinate him in Naples, but he escaped unharmed. Both H. and his queen have made themselves very popular through Italy, particularly by their courageous visits to scenes of epidemics, floods, and other disasters. They have one child, Victor Emanuel, Prince of Naples, b. 1869, Nov. 11, and betrothed to a sister of the emperor of Germany 1889. H. visited the emperor of Austria 1881, and the emperor of Germany 1889, May; effected a triple alliance between those empires and his kingdom, and secured the adhesion of Turkey thereto as a protective measure against future Russian movements, 1889, July 20. He is H. IV. in descent, but H. I. as king of united Italy.

HUMBERT, JEAN JOSEPH AMABLE: 1755, Nov. 25—1823, Feb.; b. Rouvray, France: soldier. He enlisted in the French army 1789, became maj.gen. 1794 and lieut.gen. 1798, commanded the French army sent to Ireland and surrendered to Lord Cornwallis, went to San Domingo as commander of a div. of the French army 1802, was appointed of governor of Port au-Prince and subsequently exiled for avowing republican principles, removed to New Orleans, and, excepting a service in Mexico, was employed till his death as a teacher.

HUMBLE, a. *hŭm'bl* [F. *humble*—from L. *humĭlĭs*, lowly, mean—from *humus*, the ground]: lowly; modest; meek; poor, as in humble circumstances; *low*, as opposed to *high* or *great:* V. to bring down; to reduce low; to subdue; to degrade; to mortify. HUM'BLING, imp. *-blĭng:* N. humiliation; abatement of pride. HUMBLED, pp. *hŭm'-bld.* HUM'BLY, ad. *-blĭ*, in a humble manner; without pride; modestly. HUM'BLENESS, n. *-bl-nĕs*. HUM'BLINGLY, ad. *-blĭng-lĭ.*—SYN. of 'humble, v.': to abase; lower; depress; disgrace; humiliate; dishonor; sink; crush; break.

HUMBLE-BEE, n. *hŭm'bl-bē* [Dut. *hommelen*, to hum: Ger. *hummel*, a humble-bee (see HUM)], (*Bombus*): genus of *social* bees (see BEE), having a thick and very hairy body, the hairs often arranged in colored bands; and also differing from the honey-bees in having the tibiæ of the hinder-legs terminated by two spines. The species are numerous, and are found in almost all parts of the world, from the equator to the utmost polar limits of vegetation, but they seem to abound most in temperate climates A large species is the common H. (*B. terrestris*), the *Bumbee* (boom-bee) of the Scotch; it is black, with a yellow ring before the wings, and another on the abdomen, the apex of the abdomen white. Another of the largest species is the RED-TAILED BEE (*B. lapidarius*), and one of the most abundant is the yellow and orange MOSS-BEE (*B. muscorum*), the *Foggie* of the Scotch. Some of the tropical species are much larger than those in temperate climates.



Humble-Bees and Nest:
1, humble-bee and nest; 2, orange-tailed bee; 3, moss-bee.

Humble-bees do not form communities so large as those of honey-bees; seldom more than two or three hundred occupying one nest and in some species not more than 50 or 60. The females are much less prolific than those of honey-bees. The community is dissolved on the approach of winter, the males and workers die, and only females remain in a torpid state—among moss, in rotten wood, or in some other situation where they may enjoy protection from the frost, and concealment from enemies—to perpetuate the race by founding new communities in the ensuing spring. The nests of some species, as *B. terrestris,* are in holes in the ground, at the depth of a foot or more, floored with leaves, and lined with wax, and often entered by a winding passage. Others as *B. lapidarius*, make their waxen nests among stones; while others still, as *B. mus-*

corum, make them among moss, which they mix and join with wax. The nests are enlarged as the community increases. Some of the eggs are deposited in balls of mingled pollen and honey, on which the larvæ feed, one ball containing several larvæ; afterward, eggs are deposited also in waxen cells. Workers are chiefly produced in the earlier part of the season, males and perfect females in the latter part of it. The females are larger than the males and workers. Humble-bees differ from honey-bees in their females existing together in the same community without seeking to destroy one other. There is among them nothing analogous to swarming. Their combs have not the beautiful regularity of structure which characterizes those of honey-bees; but cells of comparatively coarse appearance are clustered together, with silken cocoons of pupæ, balls of the kind above noticed, and open cells or pots filled with honey, the frequent prize of school-boys and youthful haymakers, who know well how to open and plunder the humble-bee's nest. Many animals also are expert in this, as badgers, foxes, rats, etc., which, however, devour the brood as well as the honey. The researches of Darwin, Müller, and others, have shown that humble-bees render a very important service in the economy of nature, as the agents in plant-fertilization.

HUMBLES, or **UMBLES**, n. plu. *ŭm'blz* [F. *nombles*]: the entrails of a deer; generally the entrails and inferior parts of any beast: also spelled *nombles* and *numbles*. **HUMBLE-PIE**, n. *ŭm'bl-pī*, as in the phrase, 'to eat *humble-pie*, or *umble-pie*,' to eat one's own words; to be obliged to act in a very humiliating way—that is, to stoop, as it were, to eat a pie made of *umbles*.

HUMBOLDT, *hŭm'bōlt*, **Friedrich Heinrich Alexander**, Baron **von**: one of the greatest of naturalists, who has contributed more than any man of modern times to the progress of several departments of physical science: 1769, Sep. 14—1859, May 6; b. Berlin. His father, who died when H. was not quite ten years of age, was chamberlain to the king of Prussia. He studied at the universities of Frankfurt-on-the-Oder, Berlin, and Göttingen. His love of natural history was manifest at this period; and during his residence at Göttingen (1789-90), he made visits of scientific exploration to the Harz and the banks of the Rhine, the fruit of which was his first publication, *On the Basalts of the Rhine*, etc. In the spring and summer 1790, he accompanied George Forster in a tour through Belgium, Holland, England, and France. 1791, June, he entered the Mining Acad. at Freiberg, where he had private instruction from Werner. His eight months' residence here led to the publication of his *Flora Subterranea Fribergensis et Aphorismi ex Physiologia Chemica Plantarum* (Berlin 1793). He was afterward appointed to an office in the mining dept., and spent some years in this capacity, chiefly at the Fichtelgebirge, Upper Franconia. His researches resulted in a work 'On the Irritability of the Muscular and Nervous Fibres, with Conjectures regarding the Chemical Process of Life in the Animal and Vegetable World' (*Ueber die Gereizte*, etc., 2 vols. Berlin 1797-99).

The desire of visiting tropical countries, however, led him to resign his office, and apply himself to the study of nature. He spent three months at Jena, where he was the intimate associate of Goethe and Schiller, and studied anatomy under Loder. At Paris, he contracted a friendship with a distinguished young botanist, Aimé Bonpland (q.v.), afterward his companion in many and various scenes. Some time afterward he obtained permission from the Spanish government to visit all the Spanish settlements in America and the Indian Ocean, with every additional favor which could promote his researches in the various departments of natural science. He sailed from Corunna, with Bonpland, 1799, June 5. They visited Teneriffe, ascended the Peak, and made many scientific observations. July 16, they arrived at Cumana in S. America, and in the course of five years explored a vast territory in Venezuela, Granada, Ecuador, and Peru, whence they sailed for Mexico, which they crossed from west to east. 1804 Mar. 7, H, sailed from Vera Cruz for Havana, where he spent two months, completing the preparation of materials afterward employed in *Essai Politique sur l'Isle de Cuba* (Paris 1826). From Havana he went by sea to Philadelphia, thence to Bordeaux, where he arrived after a course of travels unparalleled for variety and importance of scientific results, not only in the different departments of natural history, but also in geography, statistics, and ethnography.

H. resided in Paris till 1805, Mar., occupied in the arrangement of his collections and manuscripts, and jointly with Gay-Lussac in experiments on the chemical constitution of the atmosphere. Having visited Italy, and returned to Berlin, he accompanied Prince Wilhelm of Prussia 1807 on a political mission to France, and obtained leave from the govt. of his own country to remain there with a view to procuring the scientific co-operation necessary for the publication of his travels and for the arrangement of the vast mass of scientific materials which he had collected—for which the disturbed state of Germany at that time did not allow proper opportunity. To this task he had allotted in anticipation two years: it extended to more than 20 years, and was then incomplete. H. from the beginning of his residence in Paris was, next to Napoleon, the most famous man in Europe. He continued to reside in Paris till 1827. His great work, embodying the chief results of his travels, appeared 1807–17 in two forms, folio and quarto, each consisting of 29 vols. and containing 1,425 copper-plates. The wish of the king that he should reside in his native country was gratified 1827, when H. proceeded to Berlin; and there, in the winter of 1827–8, he gave lectures on the *Cosmos*, or physical universe.

In 1829, H. again became a traveller, Emperor Nicholas then sending out a well-appointed expedition to n. Asia, to explore the Ural and Altai Mountains, the Chinese Dsongarei, and the Caspian Sea. In this expedition, H. was accompanied by his two friends, Ehrenberg and Gustavus Rose. Its principal results were the scientific examination of the beds which produce gold and platina, the discovery of diamonds in an extra-tropical region, the astronomical determination of positions, magnetic observations, and geological and botanical collections. The whole journey occupied nine months, and extended to 2,320 miles. It is described in Rose's 'Mineralogical and Geological Travels to the Ural, the Altai, and the Caspian Sea (*Mineralogisch-geognostischer Reise*, etc., 2 vols., Berlin 1837–42); and in H.'s *Asie Centrale, Recherches sur les Chaines de Montagnes et la Climatologie comparée* (3 vols., Paris 1843). This expedition led to much increase of our knowledge of the earth's magnetism, through the adoption by the emperor of Russia of H.'s proposal for the establishment of magnetic and meteorological stations from Petersburg to Pekin; followed, on H.'s application to the Duke of Sussex, by the establishment of similar stations in the s. hemisphere

The political changes of the year 1830 led to H.'s employment in political services. He had been long on friendly terms with the members of the House of Orleans; therefore, after Louis Philippe ascended the French throne, he was chosen by the king of Prussia to carry to Paris his recognition of the new sovereign, and was during the ensuing 12 years, frequently sent to Paris to reside for four or five months. He accompanied the king of Prussia also in visits to England, Denmark, etc. During this time, he published *Examen Critique de la Géographie du Nouveau Continent* (5 vols., Par. 1835–38).

H. spent the latter years of his long life (what he used to call his 'improbable years') at Berlin, where he occupied a high position at the Prussian court. His last great work, *Cosmos* (4 vols. Stuttg. 1845–58), has been unanimously recognized as one of the greatest scientific works ever published, exhibiting in most lucid arrangement many principal facts of the physical sciences, and their relations to each other. It has been translated into all the languages in which a book of science is required. The germ of the work was the author's *Views of Nature* (Ansichten der Natur, Stuttg. 1808).

It is not easy to estimate the amount of H.'s contributions to science. The geography of Spanish America was little known previous to his travels there, during which he astronomically determined more than 700 positions; and he bestowed much labor on the preparation of the maps in which his discoveries were exhibited. His barometrical observations were likewise very numerous, as well as his observations on all points connected with meteorology. To him are due the most important generalizations concerning magnetism and climate, some results of which are seen in the isothermal and other lines on our maps.

Among his botanical works, that on the geography of plants, *De Distributione Geographicâ Plantarum secundum Cœli Temperiem et Altitudinem Montium* (Paris 1817), must be reckoned the most important. It was preceded by an *Essai sur la Géographie des Plantes* (Paris 1805). The botanical discoveries made by himself and Bonpland in their American travels were given to the world in a number of works by H. and Kunth, published at Paris 1809–34. He gave to the world also his observations, many of them most valuable, which were made at the same time, in zoology and comparative anatomy; and in a magnificent vol., *Vues des Cordillères et Monuments des Peuples Indigènes de l'Amerique,* he directed the attention of Europe to the monuments of a little known antiquity in America, and showed for the first time the possibility of combining artistic beauty with scientific accuracy. He published, 1823 *Essai Geognostique sur le Gisement des Roches dans les deux Hemisphères* (Paris); and 1831, *Fragments de Géologie et Climatologie Asiatique* (2 vols. Paris). In 1811, he produced a work on political economy, *Essai Politique sur le Royaume de la Nouvelle Espagne* (2 vols.). He obtained distinction also by his labors in the determination of the magnetic equator, and by his observations on electrical eels, and on the respiration of fishes and young crocodiles. See the great biographical work, edited by Bruhns, *Alexander von H., Eine wissenschaftliche Biographie* (1872; Eng. transl. 1872).

HUMBOLDT, Karl Wilhelm, Baron von: eminent as statesman, and for his works in philology, æsthetics, and general literature: 1767, June 22—1835, Apr. 8; b. Potsdam; elder bro. of Friedrich Heinrich Alexander von H. He was educated at Berlin, Frankfurt-on-the-Oder, and Göttingen. He eagerly studied antiquities, æsthetics, and the Kantian philosophy, as well as law, to which he professedly applied himself. After travelling in Germany, France, and Switzerland, he acquired the rank of counselor of legation, but showed little inclination for official employment, and in 1791 married, and for some years resided chiefly on his wife's estate in Thuringia, and afterward in Jena, associating most intimately with Schiller, and devoting himself to poetry and other literary and scientific pursuits. A valuable memorial of his friendship with Schiller is the correspondence between them (*Briefwechsel zwischen Schiller und Wilhelm von Humboldt*, Stuttg. und Tüb. 1830), published by him after Schiller's death. 1797–99, H. resided partly in Paris and partly in Spain; and 1801 became Prussian resident at Rome, where he remained for a number of years, in this capacity, and in that of minister-plenipotentiary, a most generous patron of young artists and men of science. From Rome he returned to his native country, to fill the high place of first minister of public instruction, in which capacity he did much to promote education in Prussia. The Berlin Univ. owned its existence to him. In 1810, he went to Vienna as minister-plenipotentiary, and from this time he took part in all the most important political affairs in which his country was concerned. After 1819 he resided chiefly at Tegel, where he laid out fine pleasure-grounds, and formed a noble collection of sculptures by the greatest masters.

His earliest literary works were collected by himself under the title 'Æsthetic Essays' (*Æsthetische Versuche*, Brunswick 1799). His 'Collected Works' appeared at Berlin (7 vols. 1841–52). H. applied himself with the greatest eagerness and assiduity to the study of philology, and produced several works on the Basque tongue, and the evidence which it affords concerning the aboriginal inhabitants of Spain—the languages of the East, and various questions connected with Oriental literature, and the languages of the South Sea Islands. One of his most important works is that 'On the Kawi Language in the Islands of Java' (*Ueber die Kawisprache*, etc., 3 vols., Berlin 1836–40), published after his death by Edward Buschmann; the introduction to which, On the Variety of Structure in Human Speech, etc., and its influence on the intellectual progress of mankind, may be said to mark a new era in the science of philology, and has given occasion to many further researches and publications. *Wilhelm von Humboldt's Briefe an eine Freundin* ('Letters to a Lady Friend,' 1847; Eng. transl., 1849), show his character in a most pure and amiable light. See the admirable biography by Haym (1856).

HUM'BOLDT River: in the w. part of Utah Territory: formed by the union of two streams which rise on the w. side of the Humboldt Mountains. It is a small and rapid stream, 350 m. in length, unnavigable even for canoes, strongly impregnated with alkaline matter, and after a westerly course, falls into a lake 40 m. in circumference, known as the Sink of Humboldt's river, which has no outlet. The banks are destitute of trees or shrubs, and the region through which it flows is one of the most barren in Utah. The Pacific railroad, traversing the United States from e. to w., runs through the valley of the Humboldt.

HUMBOLDTINE, n. *hŭm′bōl-tĭn* [after *Humboldt*]: a mineral occurring in yellowish capillary crystals in the brown coal of Germany; oxalite or natural ferrous oxalate. **Hum′boldtite**, n. *-tĭt*, datholite or native borate of lime.

HUMBUG, n. *hŭm′bŭg* [OE. *hum*, to impose on, and *bug*, an object of dread—probably only originating in slang, as from *hum* and *buzz* (see Bug)]: an imposition or trick played off under fair pretenses; a piece of trickery; a hoax; an unreliable person; a deceiver; an impostor: V. to impose upon; to cheat; to play off an imposition. **Hum′bugging**, imp. **Hum′bugged**, pp. *-bŭgd.* **Hum′bugger**, n. one who humbugs.

HUMDRUM: see under Hum.

HUME, *hūm*, David: philosopher and historian: 1711, Apr. 26 (O.S.)—1776, Aug. 25; b. Edinburgh; son of Joseph H. or Home, who was a scion of the noble house of Home of Douglas, and laird or proprietor of the estate of Ninewells in Berwickshire. David, being the younger son, had to make his own fortune with no assistance other than an education and the influence of his respectable family. He was educated at home and at the college of Edinburgh. His father designed law as his profession, and he took the initial steps of the proper practical training, but it was not a pursuit to his liking. Deserting it, he experimented on a mercantile house in Bristol; but commerce was not more congenial to him than jurisprudence, and he gave it a very short trial. He now became a musty student, burying himself in books with no settled practical object before him. He recorded his sufferings at this time from despondency and depression of spirits, caused, apparently, by the effects on the stomach of monotonous study. At 23 years of age, he went to France, and lived in La Fleche, where he describes himself as wandering about in solitude, and dreaming the dream of his philosophy. In 1739, he published the first and second book of *Treaties on Human Nature*—the germ of his philosophy, and still perhaps the best exposition of it, since it has there a freshness and decision approaching to paradox, which he modified in his later works. Although it marked the dawn of a new era in philosophy, this book was little noticed. It was a work of demolition. By separating the impressions or ideas created on the thinking mind by an external world from the absolute existence of that world itself, he showed that almost everything concerning the latter was taken for granted, and he demanded proof of its existence of a kind not yet afforded. It was thus that he set a whole army of philosophers at work, either to refute what he had said, or seriously to fill up the blanks which he had discovered; thus he originated both the Scotch and the German school of metaphysicians. In 1741,2, he published two small vols., ***Essays Moral and Political;*** they were marked by learning and thought, and elegantly written, but are not among his remarkable works. He felt keenly at this time the want of some fixed lucrative pursuit, and his longing for independence was the cause of a sad interruption to his studious and philosophical pursuits. He was induced to become the companion or guardian of an insane nobleman, and had to mix with the jealousies and mercenary objects of those who naturally gather round such a centre. In 1747, he obtained a more congenial appointment, as sec. to General St. Clair, whom he accompanied in the expedition to the coast of France and the attack on Port L'Orient, the depot of the French E. India Company; this affair had no important results, but it gave H. a notion of actual warfare. Next year, he accompanied the general in a diplomatic mission to France, and as he travelled he took notes of his impressions of Holland, Germany, and Italy, published in his *Life and Correspondence.* In 1751, he published his *Inquiry into the Principles of Morals,* a work of great originality, one of the clearest expositions of the leading principles of what is termed the utilitarian system. At the same time, he intended to publish *Dialogues concerning Natural Religion,* but his friends, alarmed by the skeptical spirit pervading them, prevailed on him to lay them aside, and they were not made public until after his death. In his 35th year, he had unsuccessfully competed for the chair of moral philosophy in Edinburgh, and at this period we find him unsuccessful also in an attempt to obtain the chair of logic in Glasgow. Next year, 1752, appeared his *Political Discourses.* Here, again, he made an era in literature, for in this little work he announced those principles of political economy comprehending the doctrine of free-trade, which it fell to his friend Adam Smith more fully and comprehensively to develop. He was appointed at this time keeper of the Advocates' Library, with a very small salary, which he gave to a charitable purpose. It was here that, surrounded with books, he formed the design of writing the history of England. In 1754, he issued a quarto vol of *History of the Stuarts, containing the reigns of James I. and Charles I.*, and presently completed this portion of the work in a second vol., bringing it down to the Revolution. He then went backward through the House of Tudor, and completed the work from the Roman period downward, 1762. While so employed, he published *Four Dissertations: the Natural History of Religion; of the Passions; of Tragedy; of the Standard of Taste* (1757). Two other dissertations, intended to accompany these, were cancelled by him after they were printed—they are *On Suicide* and *The Immortality of the Soul,* and were subsequently printed in his works.

In 1763, he went to France as sec. to Lord Hertford's embassy; here he was in his element, and found fame at last. He became familiar with the brilliant wits and savants of the Parisian circle—with Turgot, D'Alembert, Helvetius, Holbach, Diderot Buffon, Malesherbes, Crebillon, and the rest, as well as with the no less eminent women, De Boufflers, Page de Boccage, Geofrin, Du Deffand, and L'Espinasse. His sojourn in Paris was unfortunate in bringing him into intimacy with the restless, vain, and self-tormenting Rousseau, who, after experiencing much substantial kindness from H., grew suspicious, and forced him into a memorable quarrel. After his return home, 1766, he accepted the responsible office of under-sec. of state for the home department. In his own life he says: 'I returned to Edinburgh in 1769 very opulent (for I possessed a revenue of £1,000 a year), healthy, and, though somewhat stricken in years, with the prospect of enjoying long my ease, and of seeing the increase of my reputation.' His health gave way, 1774, and he died at Edinburgh two years later. In philosophy, H. developed with vigor and logical exactness the empirical principles of Locke. See H.'s *Life*, by J. H. Burton (1850); *Hume*, by Huxley (1879); and his works edited by T. H. Green and T. H. Grosse (4 vols. 1875).

HUME, Joseph: British politician: 1777, Jan.—1855, Feb. 20; b. Montrose, Scotland; son of the master of a small coasting-vessel, who, dying while his family were young, left his widow and children in poverty. He studied for the medical profession; was admitted 1796 a member of the College of Surgeons, Edinburgh; and became assist.-surgeon in the marine service of the E. India Company. He acquired the native languages, and during the Mahratta war, 1802-7, was Persian interpreter to the army. He returned to England 1808, with an honestly-earned fortune of £30,000 or £40,000; and entered the house of commons 1812, as M.P. for the borough of Weymouth and Melcombe Regis. The future radical was then of tory politics, and paid a sum of money for his seat, which he held only for a few months. He obtained, 1818, a seat for the Aberdeen dist., comprehending his native town of Montrose. In 1830, he had gained such distinction as a radical reformer, that he was returned without opposition as one of the members of Middlesex, which he represented until 1837. In 1842 he was again chosen for Montrose, and held the seat till his death. Although not of brilliant abilities, he had indefatigable industry, hated sinecures and official abuses of every kind, and urged economy in the public service.

HUMECTIVE, a. *hū-mĕc'tĭv* [L. *hūmectārĕ*, to moisten]: able to moisten. **Hu'mecta'tion**, n. *-tā'shŭn*, a making wet.

HUMERAL, a. *hū'mėr-ăl* [mid. L. *humĕrālis*—from L. *humĕrŭs*, the shoulder]: pertaining to the shoulder. **Hu'merus**, n. *-ŭs*, the arm from the shoulder to the elbow; the bone of that part: see Arm. **Hu'meral-veil**, in *Rom. ritual*, an oblong scarf of the same material as the vestments, worn round the shoulders by the priest, deacon, or sub-deacon in a portion of the services.

HUMETTY, *hū-mĕt'tĭ*, or **Humet**, or **Humette**, *hū-mĕt'* [Fr. *Humette*]: in heraldry, a cross or other ordinary which is cut off, and nowhere reaches the edge of the shield.

HUMIC, a. *hū'mĭk* [L. *humus*, soil]: applied to an acid produced from the decomposition of mold by an alkali: see Humus.

HUMID, a. *hū'mĭd* [F. *humide*—from L. *hūmĭdŭs*, moist—from *hūmērĕ*, to be moist or damp]: rather wet or watery; moist; damp. HUMID'ITY, n. *-ĭ-tĭ*, moisture; dampness.

HUMIFUSE, a. *hū'mĭ-fūs* [L. *humus*, the ground; *fūsŭs*, spread]: in *bot.*, spread over the surface of the ground; recumbent.

HUMILIATE, v. *hŭ-mĭl'ĭ-āt* [L. *humĭlĭātŭs*, humiliated —from *humĭlĭs*, lowly, mean—from *humus*, the ground]: to humble; to depress; to mortify. HUMIL'IATING, imp.: ADJ. abasing to pride; mortifying. HUMIL'IATED, pp. HUMIL'IA'TION, n. *-ā'shŭn* [F.—L.]: the act of reducing from a high to a low state or condition; the state of being humbled or reduced to lowliness. HUMIL'ITY, n. *-ĭ-tĭ* [F. *humilité*—from L. *humilitātem*]: freedom from pride; modest estimate of one's own worth.—SYN. of 'humility': lowliness; humbleness; modesty; diffidence; submissiveness.

HUMITE, n. *hū'mīt* [after Sir A. *Hume*]: a gem of a transparent vitreous brown color, found in the ejected masses of Vesuvius.

HUMMEL, *hûm'ĕl*, JOHANN NEPOMUK: 1778, Nov. 14 —1837, Oct. 17; b. Presburg, Hungary: pianist and composer. After preliminary studies he went to Vienna, where Mozart, forming a high opinion of his talents, took him under his tuition. He appeared in public, 1787, being then but nine years of age, at a concert given by Mozart in Dresden; after which he gave concerts in Germany, Denmark, England, and Holland. In London, H. had the advantage of Clementi's instructions, 1791; and in Vienna, 1793, he took lessons from Albrechtsberger in composition, and from Salieri in dramatic writing. 1803–11, he held the post of Kapellmeister to Prince Nicholas Esterhazy; and later he was Kapellmeister at Stuttgart and Weimar. He visited Paris for the first time 1822; and became conductor of German Opera at the King's Theatre in London, 1833. He died at Weimar. H.'s pianforte works rank among the purest and most classical compositions for that instrument—his concertos are full of artistic skill; he composed masses also, which are in high esteem, and several now nearly-forgotten operas and cantatas. His playing was characterized by the same solid qualities as appear in his compositions.

HUMMELER, *hŭm'ĕl-ėr:* implement for *hummellimg* barley—i.e., removing the awn from the grain after it has been thrashed. A common kind of H. is a set of blunt knives fixed in a frame, with a handle, by means of which they are used in the manner of stamping. Another form consists of blunt knives set on a roller. These implements are worked by the hand. But hummellers of various construction are often attached to thrashing-machines, in all of which blunt knives are made to pass frequently through the grain.

HUMMING-BIRD, *hŭm'ĭng-bėrd* (*Trochilus*): Linnæan genus of birds, now constituting a family, *Trochilidæ*, of order *Insessores*, tribe *Tenuirostres*. The species are numerous, more than 300 being known, while new ones are continually being discovered. They are found only in America and its islands, though represented, both in habits and in brilliancy of plumage, by the Sun-birds (q.v.) of eastern tropical regions. Most of them are tropical, though a few species are summer visitants of the colder parts of America, seldom, however, beyond lat. 57° n.; while some of those found only within the tropics inhabit elevated mountainous tracks, even to the confines of perpetual snow. The dazzling brilliancy of humming-birds, the extreme rapidity with which they dart through the air, their hovering above the flowers from which they obtain their food, with humming sound of wings, which move so quickly as to be indistinctly visible, or, 'like a mist,' have attracted admiration since the discovery of America. The diminutive size of almost all—some of them being the smallest of birds, and if stripped of their feathers, not larger than a humble-bee—has further rendered them objects of interest, while the plumage of the different species exhibits an almost endless variety of forms, as well as of colors, in crests, neck-tufts, leg-tufts and many an extraordinary development of tail.

Humming-Bird and Nest.

They have slender bills which are also generally long, and in some extremely so, the form of the bill showing wonderful adaptation to the kind of flowers from which the bird obtains its food—straight in some curved in others. They do not, as was long supposed, feed on honey alone, but largely, some perhaps chiefly, on insects, not rejecting spiders; and they often snatch away the insects entangled in spiders' webs. The lower mandible fits into the upper, and the bill is thus adapted as a tube for sucking, in which, as well as in seizing small insects within the recesses of flowers, the tongue also is a very efficient organ. The tongue is very long, and capable of being darted out to a still greater length; the bone of the tongue (*hyoid bone*) being much elongated, and its branches passing round the back of the skull to the forehead, where they meet in a point before the line of the eyes. The tongue itself consists of two filaments, joined together for the greater part of their length, and separated at the tip. The wings are very long and powerful, the first quill-feather the longest, the rest shorter in succession. They construct their nest with nice art, generally of lichens and fibrous substances such as cotton: they lay no more than two eggs. They are very bold in defense of their nests and young, and are said to strike fearlessly with their needle-like bills at the eyes of birds of prey, which they far surpass in agility and rapidity of flight. They have indeed remarkable pugnacity. They are easily tamed and rendered familiar, and have been known to return again in spring, after a winter migration to a warmer climate, to the window from which they had been allowed to escape. Attempts to keep tamed humming-birds have generally failed, perhaps through starvation on account of their being supposed capable of feeding only on honey or syrup, whereas insect food seems necessary for them. Attempts made to take them across the Atlantic have, in most cases, been unsuccessful. The Ruby-throated H. (*Trochilus colubris*) is the only species found in the n. Atlantic states. It ventures even into the regions of the Hudson's Bay Company.

One of the greatest authorities on the H.-B. is Gould, whose work is magnificently illustrated.

HUMMOCK, n. *hŭm'mŏk* [Norw. *hump*, a knoll, a piece of land]: a hillock or eminence of land, as seen from the sea or a distance; among *sailors*, a large mass of floating ice.

HUMMUMS, n. plu. *hŭm'mŭmz* [Pers. *hammam*, a bath]: in *Persia*, sweating-places or baths.

HUMOR, n. *hū'mėr* [L. *hūmor*, fluid of any kind, moisture—from *hūmērĕ*, to be moist: OF. *humor;* F. *humeur*]: any moisture or fluid of the body except the blood; now usually restricted to any moisture of the body; certain fluids of the eye. Hu'moral, a. *-ăl*, pertaining to the fluids or humors of the body, or proceeding from them; in *med.*, applied to that old doctrine which ascribed all diseases to a degenerate or disordered state of the fluids of the body—see note under title next below. Aqueous humor, the watery matter which fills the space in the fore part of the eyeball between the cornea and iris. (The English spelling of Humor is usually *Humour;* as with other words of similar ending.)

HUMOR, n. *hū'mėr* [F. *humeur*—from L. *hūmōrem*, fluid, moisture (see Humor, above)]: turn or temper of mind; the talent which perceives and generalizes the peculiarities of persons or circumstances in a witty and kindly manner; caprice; present disposition; in *OE.*, practice: V. to gratify by yielding to a particular inclination or desire; to indulge. **HU'MORING**, imp. **HU'MORED**, pp. *-mėrd.* **HU'MORLESS**, a. without humor. **HU'MORIST**, n. *-mėr-ĭst*, one who has a playful fancy for odd peculiarities and circumstances; a wag or droll fellow. **HU'MOROUS**, a. *-ŭs*, fitted to excite laughter; fanciful; playful. **HU'MOROUSLY**, ad. *-lĭ.* **HU'MOROUSNESS**, n. oddness of conceit; capriciousness. **HU'MORSOME**, a. *-sŭm*, odd; peevish; petulant. **HU'MORSOMELY**, ad. *-lĭ.* *Note.*—The terms 'good humor' and 'bad humor' are derived from the old 'humoral pathology,' according to which there were four principal moistures or *humors* in the body—namely, *choler*, *melancholy*, *phlegm*, and *blood*, on the due proportion and combination of which the disposition of body and mind depended, and thus the 'humors or temperaments' were reckoned four—viz., 'choleric, melancholic, phlegmatic, and sanguine,' produced respectively by *choler*, *melancholy*, *phlegm*, and *blood:* see MEDICINE, HISTORY OF.—SYN. of 'humor, n.': moisture; temper; disposition; jocularity; merriment; petulance: peevishness; trick; practice; whim; inclination; wit; satire; pleasantry; mood; frame; fancy; —of 'humorous': moist; damp; dewy; humid; capricious; irregular; whimsical; pleasant; jocular; jocose; merry; witty.

HUMP, n. *hŭmp* [Dut. *hompe*, a hunch, a piece cut off something—from *hompen*, to cut off the extremities of a thing: O.Sw. *hump*, a piece of land]: the protuberance formed by a crooked back, as that on a camel. **HUMP'BACK**, n. *-băk*, one with a crooked back. **HUMP'BACKED**, a. *-băkt*, having a crooked back.

HUMPHREY, *hŭm'frĭ*, HEMAN, D.D.: 1779, Mar. 26—1861, Apr. 3, b. W. Simsbury, Conn.: Congl. minister. He graduated at Yale College 1805, was pastor of the First Church at Fairfield, Conn., 1807–17; of the First Church at Pittsfield, Mass., 1817–23; and pres. of Amherst College 1823–45. He received the degree D.D. from Middlebury College 1823. He was a voluminous author and contributor to the religious and secular press.—His son, EDWARD PORTER H., D.D., LL D., b. Fairfield, Conn., 1809, Jan. 28, graduated at Amherst College 1828, and Andover Theol. Seminary 1833; was pastor of the 2d Presb. Church at Louisville, Ky., 1835–53; prof. of ecclesiastical history in Danville Theol. Seminary, Ky., 1853–66; pastor of the College St. Church in Louisville, 1866–79, and pastor emeritus since 1879.—Another son, ZEPHANIAH MOORE, H., D.D.: 1824, Aug, 30—1881, Nov. 13; b. Amherst, Mass; graduated at Amherst College 1843, and Andover Theol. Seminary 1849; was pastor of Presb. churches in Racine and Milwaukee 1850–59, Chicago (First Presb.) 1859–68, Philadelphia (Calvary Presb.) 1868–75; moderator of the gen. assembly of the Presb. Church 1871, and prof. of ecclesiastical history and church polity in Lane Theol. Seminary 1875–81.

HUMPHREYS, *hŭm'frĭz*, ANDREW ATKINSON, LL.D.: 1810, Nov. 2—1883, Dec. 27; b. Philadelphia: soldier. He graduated at the U. S. Milit. Acad. 1831; served in the Seminole Indian war; resigned his commission 1836; was employed by the govt. as civil engineer the same year; reappointed to the army 1838; promoted capt. 1848; maj. 1861, Aug.; col., brig.gen. of vols., and chief topographical engineer of the Army of the Potomac 1862, Apr.; maj.-gen. of vol., and chief of staff to Gen. Meade 1863, July 8; brevetted maj.gen. U.S.A. 1865, Apr. 6; resigned from the vol. service 1866, Aug. 31; appointed chief of engineers U.S.A. with rank of brig.gen. 1866, Aug. 8; and was retired 1879. He was an original member of the National Acad. of Sciences, member of numerous learned bodies, author of several historical and technical works, and received the degree LL.D. from Harvard Univ. 1868.

HUMPHREYS, DAVID, LL.D.: 1752, July—1818, Feb. 21; b. Derby, Conn.: soldier and poet. He graduated at Yale College 1771; served through the revolutionary war, was aide to Washington, and was voted by congress a sword for gallantry at Yorktown; was appointed sec. to the American commissioners to negotiate treaties with European powers 1784; first U. S. minister to Portugal 1790, and minister to Spain 1797; became brig.gen. of the Conn. veteran vols. 1812; and afterward engaged in woolen manufacture. He lived with Washington at Mount Vernon several years, and during and after the revolutionary war wrote many stirring and patriotic poems. He received the degree LL.D. from Brown Univ. 1802, and Dartmouth College 1804, and became a fellow of the Royal Soc. of London.

HUMPTY-DUMPTY, n. *hŭm'tĭ-dŭm'tĭ* [Eng. *hump*, a protuberance; *dump*, a short fat piece]: a short, thick, round-shouldered person; a fat dwarf.

HUMULIN, n. *hū'mū-lĭn* [*Hum'ŭlŭs lup'ŭlŭs*, the systematic name of the hop plant—from L. *humus*, the ground]: the narcotic principle of the hop.

HUMUS, n. *hū'mŭs* [L *humus*, soil]: the dark brown or black soil formed by the decay of vegetable matter. HUMIC ACID, *hū'mĭk*, acid derived from humus.—*Humus* is a generic term applied to a group of closely allied substances, which collectively form the organic matter of the soil. These may be divided into three great classes: 1. Such as are soluble in water—crenic, apocrenic, and ulmic acids; 2. Such as are soluable in alkaline solutions, but not in pure water—humic and geic acids; 3. Such as are insoluble in all menstrua—humin and ulmin.

All of these are amorphous, ranging in color from brownish yellow to blackish brown, and non-volatile; they all are probably composed of carbon, hydrogen, and oxygen, and all are remarkable for their power of fixing ammonia. 'They all are products of the decomposition of vegetable matters in the soil, and are formed during their decay by a succession of changes, which may be easily traced by observing the course of events, when a piece of wood, or any other vegetable substance, is exposed for a length of time to air and moisture. It is then found gradually to disintegrate with the evolution of carbonic acid, acquiring first a brown, and finally a black color. At one particular stage of the process, it is converted into one or other of two substances, called humin and ulmin, both insoluble in alkalies, and apparently identical with the insoluble humus of the soil; but when the decomposition is more advanced, the products become soluble in alkalies, and then contain humic, ulmic, and geic acids; and finally, by a still further progress, crenic and apocrenic acids are formed, as the result of an oxidation occurring at certain periods of the decay.'—Anderson's *Agricultural Chemistry*, 1860, p. 22.

The roots and other vegetable matters remaining in the soil gradually undergo the changes described in the preceding extract, and are thus converted into humus, which is found only in the surface soil, in which its quantity varies with the activity and profusion of the vegetation.

Numerous analyses of the humus compounds have been made, but, as might be expected from the gradual passage of one substance into another, they present considerable discrepancies. According to Mulder, perhaps the highest authority on this subject, geic acid is represented by $C_{20}H_{12}O_7$; humic acid, by $C_{20}H_{12}O_6$; ulmic acid, by $C_{20}H_{14}O_6$; crenic acid, by $3H_2O,2C_{12}H_{12}O_8$; apocrenic acid, by $H_2O,C_{24}H_{12}O_{12}$. Crenic and apocrenic acids (which derive their names from *crenē*, the Greek word for *a spring*) occur not only in combination with ammonia, in the organic matter of the soil, but are likewise found in many mineral waters, and in the ochreous deposits that accumulate round the margins of chalybeate springs. All the above-named substances closely resemble in their composition the woody fibre or cellulose ($C_{12}H_{22}O_{11}$), from which they are derived by a slow process of oxidation.

Chemists hold very different opinions regarding the physiological value of humus. The earlier chemists, and Mulder of later times regard it as the almost (if not quite) exclusive source of the organic constituents of plants; while Liebig and the great majority of chemists of the present day regard the atmosphere (which consists of a mixture of nitrogen and oxygen gases, watery vapor, carbonic and nitric acids, and ammonia) as capable of affording an abundant supply of all these substances. The latter is probably the more correct view; but though humus is not a direct source of the organic constituents of plants, and is not absorbed by their roots, as was formerly supposed, it is so indirectly in at least two modes—viz., by evolving during its decomposition a certain quantity of carbonic acid which can be absorbed, and by its power of absorbing and combining with ammonia, and with certain soluble inorganic constituents of plants. Its power of absorbing ammonia is readily shown by pouring some ammoniacal solution on peat (which contains the humus compounds in great abundance); the pungent smell at once disappears, which is an evidence that combination has taken place. It possesses a similar but less marked power in reference to potash, soda, lime, and magnesia, and thus acts an important part in preventing these substances from being washed out of the soil. The physical properties of humus are also of great importance in relation to the fertility of the soil. It is one of the most highly hygrometrical substances known. While silicious sand absorbs only one-fourth of its weight of water, and again gives off, in the course of four hours, four-fifths of its water, humus imbibes nearly twice its weight of water, and retains nine-tenths of it after four hours' exposure. It thus confers on the soil the power of absorbing and retaining water, and thus diminishes its tenacity and allows of its being more easily worked; and additionally, from its dark color, it causes the more rapid absorption of heat from the sun's rays. Hence, even if not contributing directly to the food of plants, it is in moderate quantity an indispensable constituent of a fertile soil. The best wheat-bearing soils contain 9 or 10 per cent. of humus compounds.

HU-NAN, *hô-nân':* province in the lake district of China, on the s. side of Tung-ting-hu, the largest lake in China. It is fertile, yielding two crops of rice annually. Its mountains yield malachite, iron, lead, and coal. Area, 74,320 sq. m. Pop. 18,652,507.—Its cap. is Chang-sha-fu, on the river Siang.

HUNCH, n. *hŭnsh* [Dut. *hompe*, a lump: Norw. *hump*, a knoll (see HUMP)]: a hump or protuberance; a lump or thick piece; a push or jerk, as with the elbow: V. to push or jostle, as with the elbow. **HUNCH'ING**, imp. **HUNCHED**, pp. *hunsht.* **HUNCH'BACK**, n. one with a lump on the back. **HUNCH'BACKED**, a. *-băkt*, having a crooked back.

HUNDRED, n. a. *hŭn'drĕd* [Icel. *hundrad;* Ger. *hundert*, a hundred—from Icel. *hund*, ten; *raed*, a reckoning: comp. Gr. *hekaton;* L. *centum;* W. *cant;* Gael. *ceud;* Ir. *cead*, a hundred]: ten multiplied by ten; a number consisting of ten times ten; in *commerce*, a variable amount of different kinds of goods; a division of a county in England. **HUN'DREDERS**, inhabitants of a hundred (q.v. below). **HUN'DREDTH**, a. *-drĕdth*, the one part or division of anything divided into a hundred parts. **HUN'DREDFOLD**, n. a hundred times as much. **HUN'DREDWEIGHT**, n. *-wāt*, 100 or 112 lb.—contr. into *cwt.* **HUNDRED DAYS**, in *F. hist.*, period 1815, Mar. 20—June 22, from the time when Napoleon escaped from Elba and reached Paris, to the time when he abdicated in favor of his son.

HUNDRED, *hŭn'drĕd*, in English Law: ancient subdivision of counties, whose origin is not clearly settled, though probably the name arose from there being a hundred sureties in each to keep the peace. The H. was intermediate between a parish or township and a county—the counties in England being large in extent and population. Between the H. and the county was sometimes a further intermediate division, the trithing, now called the riding, soke, the lathe, or the rape. In ancient times, if a crime was committed, such as robbery, maiming of cattle, burning of stacks, etc., the H. had to make it good. The old distinctions have now become almost obsolete. But the characteristic of a H. is still this, that it has a constable or bailiff, and when any damage is done by rioters feloniously destroying property, the individual owner has his remedy by suing the H. for the damage In order to secure this remedy, the party or his servant must, within seven days, go before a justice, and state on oath the names of the offenders, and engage to prosecute them. So, where there is no H., the county, or city, or town, is liable in like manner, and in all cases the expenses are paid by the county rate, or a rate in the nature of a county rate. In the n. counties, a H. is generally called a wapentake, a term which probably had originally a military reference. See RIOT.

HUNG, *hŭng:* pt. and pp. of HANG, which see. **HUNG-BEEF**, beef salted and dried.

HUNGARIAN GRASS (*Panicum Germanicum*): annual plant of the millet family, cultivated for forage. It grows rapidly, and on rich land produces large crops. It is valuable for feeding green or for curing as hay. H. G. should be sown June 1—15 in a mellow soil. It succeeds on inverted sod if the surface is thoroughly pulverized. A moderate dressing of fine manure, wood ashes, or commercial fertilizer, will largely increase the crop. Three pecks of seed per acre suffice. If designed for hay it should be cut when the heads appear. For green fodder it can be used as soon as large enough to feed. It requires from two to three days in which to cure. If fed in large quantities it sometimes proves injurious but when fed lightly, in connection with other hay, it is excellent for both cattle and horses.

HUNGARY, *hŭng'ga-rĭ* (Ger. *Ungarn;* Magyar, *Magyar Orszdg* (Land of the Magyars): one of the two portions of the Austro-Hungarian empire. According to the fundamental laws of the realm, the emperors of Austria are kings of H., which formerly comprehended H. proper, Croatia, Slavonia, Dalmatia, the Illyrian sea-coast, Transylvania, and the whole of the military frontier. After 1848, these pendicles were dissociated administratively from H. proper and converted into crown lands. Since 1867, H., Croatia, Slavonia, Transylvania, and the Military Frontiers, have constituted the kingdom of H., one member of the bipartite empire The two knots which tie Austria proper and H. together are the person of their common sovereign and the 'Delegations'—a parliament of 120 members, of which 60 are supplied by either portion of the empire. This body legislates for war, finance, and foreign affairs; and the ministers of these three departments are responsible to it. H., with Transylvania, Croatia, and Slavonia, has 124,640 sq. m. Pop. (1880) 15,610,719.

For the general features of the country, see AUSTRIA. The soil of the vast plains consists chiefly of humus and clay, and is of great fertility. Huge tracts of sand are found in several parts; there are also swamps all along the Theiss. The level tracts in the e. part of H. are subject to periodical drought, and to frequently recurring blasts. The heat is sometimes so great, that it is impossible to walk with bare feet on the burning sand. Autumn and winter are of short duration. In spring, great part of the level land becomes an almost impassable ocean of mud. Hail storms during summer, and the severity of cold during winter, cause much anxiety to farmers, especially to the numerous vine-growers. Ague is common in some regions, but the climate as a whole is healthful.

H. is an agricultural country in the main, though the methods of cultivation are exceedingly defective. In many places the ground is not even manured. In H. proper, exclusive of Transylvania, Croatia, and Slavonia, about $\frac{1}{12}$ of the whole soil is unproductive, $\frac{1}{8}$ is arable land, $\frac{1}{4}$ is wooded, $\frac{1}{4}$ in pasture, $\frac{1}{71}$ appropriated to culture of the vine. Magnificent forests clothe all the hilly regions; yet in the low country wood is so scarce that dung has to be used for fuel. Grain is produced in abundance, and beyond what is needed for home consumption. The order of importance of the various kinds is oats (of which $\frac{1}{3}$ is exported), barley, rye, maize, and wheat. Vast quantities of hemp and flax are raised. For more than 150 years tobacco has been raised in Hungary. Large quantities are still grown: the sale is a government monopoly. Potatoes are little used for food save by Germans, but are available for making spirits. The culture of fruit is left almost wholly to the Germans, and is very productive in their hands; the fine climate brings, e.g., no less than 50 kinds of peaches to perfection. In many parts of H., figs, almonds, and even olives thrive. Wine is one of the most important sources of Hungarian comfort and wealth. Only France excels H. in the quantity of wine produced; the total production is estimated at 400,000,000 gallons, and could be much increased. But the system of culture, and the methods used in preparing the wine are so primitive and imperfect, that not over 50,000,000 gallons can be made fit for export. The wine of H. was used in England in the days of James I. The finest Hungarian wines are the yellowish brown Tokay (to the production of which more than 100 sq. m. of land are given), a dark red wine called Menes, and the well-known Ruster dessert-wine. Cattle-breeding is a great source of trade; and enormous numbers of swine, and of geese and ducks. are kept. Horses are carefully reared in H. Silk-breeding has rapidly developed of late; in 1883, it was pursued in 430 communes. Rice-planting is on the increase. More than 100 agricultural societies, in 1883, testified to enterprise in this department. Chamois, bears, and wild boars are still found. Red deer abound, as do fowls and fish of all descriptions. In its minerals, H. has vast sources of wealth. Russia alone surpasses H. for its richness in the noble metals; considerable quantities of gold and silver, generally mingled, are found in H. Copper and iron are largely produced. Antimony, cobalt, and arsenic are wrought, as are salt, soda, natural saltpetre, and alum. Opals and amber occasionally appear; marble and alabaster, coal, pitch, and graphite are available in various districts. In industry, H. is yet far behind; a little of the commoner kinds of linen and woolen cloths, leather, sugar, glass, paper, and spirits are its chief manufactures. The trade in grain, flour, sheep, wool, and skins is brisk. Of the total population, more than 5,000,000 are engaged in agriculture and mining, 65,000 in industrial work, 134,000 in trade, and nearly 180,000 in professional pursuits. H. has few good roads; the rivers, especially the Danube, are the great channels of communication. About 5,000 m. of railway are in operation. Besides Budapest (Pesth), the capital, with pop. (1880) more than 350,000, there are in H. four cities of 50,000 inhabitants or more, and one or two others with more than 40,000.

In educational affairs, H. has till of late been very backward. In 1871, out of 2,206,187 children of sufficient age, 1,253,500 were at school; 47 per cent, of the men and 55 per cent. of the women in H. can neither read nor write. Yet the educational apparatus of H. is on a liberal scale. The Univ. of Budapest has 52 ordinary and 15 extraordinary professors, 38 *privat-docents*, and nearly 2,500 students. The Polytechnic School there has about 50 teachers. Since 1872 there is a univ. in Klausenburg also. There are theological seminaries for all the various confessions; and of late great efforts, not without good result, have been made to raise the educational status of the country; insomuch that the annual expenditure on education rose from 981,000 florins in 1868 to 2,764,000 florins in 1872. In 1871,2 there were 900 new schools opened, and 1,002 new schoolhouses erected. Besides 14,000 primary schools, there are now in H. and Transylvania about 180 gymnasia; and academies, learned societies, and associations for promotion of Hungarian literature, exist. Newspapers and periodicals to the number of 205 appear regularly; of these more than half are Magyar, about 30 are Slavic, one-fourth are German, and two or three Rumanian.

In no other European country is there such a mixture of races differing in blood, speech, and manners. In H. proper about 50 per cent. of the whole population is Magyar; Slavic (including Slovaks, Ruthenians, Croats, and Serbs), 20 per cent.; German, 14; Rumanian, 17; Jew, 1½; Gipsy, ½. In Transylvania the number of various elements is as great, Rumanians forming here three-fifths of the whole, and the Magyars being about half as many. In Croatia and Slavonia naturally Slavs have the predominance: 98 per cent. of the whole being Croat or Serb (bitterly hostile to Magyar domination). The town of Fiume, which has since 1870 been atached to H., is quite German in character. In 1880 the pop. of H. in the wide sense, contained 6,480,000 Rom. Cath.; 1,487,000 United Greeks; 1,120,000 Lutherans: 2,020,000 Calvinists; 1,960,000 Greek Church; 55,800 Unitarians; 625,000 Jews; besides minor sects. The divisions of race coincide to a large extent with religious distinctions. All Hungarians, Germans, and Slovaks, as also the Croats in H., are either Rom. Cath. or Prot.; Rumanians, Ruthenians, and Serbs, are either United or Orthodox Greeks. In H., Transylvania, Croatia, and Slavonia, the Rom. Cath. Church has five abps. and 20 bishops; 203 monasteries, with 2,417 inmates, and 80 nunneries with 1,136 nuns. The Greek Catholics are under an abp. and seven bishops, and have nine monasteries. The Orthodox Greeks have two abps. and seven bishops, and have three monasteries. The Lutherans and Calvinists have each five superintendents or overseers of ecclesiastical districts. The Unitarians have but one.

History.—The Hungarians—in their own language, Magyars—sprang from that group of Tataric races to which the Turks also belong (see TURANIAN LANGUAGES); their ancient seats being in central Asia. Part of the people emigrated in the direction of the Ural Mountains, and thence, pressed by the warlike swarms of Paimacitae, to the regions now known as Moldavia and the Ukraine. In 889 forty thousand families, counting more than 200,000 warriors among them, left their homes under the leadership of Almos, and after many a hard battle arrived at the n.e. frontiers of the land, which, under the name of Pannonia, contained several independent realms, such as Great Moravia, the Slavo-Bulgarian kingdom of Zalan, etc. The great task of conquest being now at hand, old Almos resigned, and his son Arpád being unanimously elected chief, the armed invasion began at once in several directions. At the end of 899, Arpád's sway extended from the Carpathians down to Servia, and from the e. borders of Transylvania to the foot of the Styrian mountains. According to a covenant between Arpád and the other chiefs, the leadership was to remain with the descendants of the former as long as they should keep faithful to the nation. The foundations then laid for the political organization of the realm, have been developed through lapse of time into that system of municipal independence which has outlived the storms of nearly a thousand years, and contains, even after the disastrous issue of 1849, the germs of future national greatness. The periods into which the history of H. is divided are: 1. Period of chiefs of the House of Arpád (894–1000): 2. Period of kings of the House of Arpád (1000–1301); 3. Period of kings from different (foreign) families 1301–1526); 4. Period of kings of the House of Hapsburg (1526 to the present day). The first king of H. was Stephen I., called the Saint; he was crowned 1000 with a crown that had been sent to him by the pope, Sylvester II. It forms to-day the upper part of 'the sacred crown of Hungary.'

With St. Stephen, a new era began for H.; Christianity took the place of heathen superstitions; the savage incursions, by which *the people of the east* had become a scourge to neighboring nations, ceased entirely. The House of Arpád gave 20 kings to H., the greatest of whom undoubtedly was St. Stephen I., who, besides dividing the realm into ten bishoprics, more completely developed the administrative system. Among his successors, Béla I. (reigned 1061–63) distinguished himself by saving the hardly begun Christian civilization against the rebellious attempt of a numerous party. Ladislaus I. is renowned for wise legislation and for great personal valor. Such was the fame of his deeds, that at the council of Piacenza (1095) he was unanimously elected leader of the crusade to Palestine. Death prevented the hero from accomplishing the task. Coloman (reigned 1095–1114) went by the name of 'Learned,' and many of his laws show how much he was in advance of the age. Gejza II. (reigned 1141–61) was but ten years old when crowned; nevertheless, his reign is worthy of mention, for it was then that colonists from Flanders settled in Northern H., as also in Transylvania; in consequence of which, mining and several branches of industry made rapid progress. Andrew II. (reigned 1205–35) is known in connection with the Crusades; the Hungarian Magna Charta (Bulla Aurea), forced from him by his nobles, dates from 1222. Béla IV. (reigned 1235–70) showed great qualities in subduing the indomitable arrogance of the oligarchy, and in healing the wounds of his people after the terrible invasion of the Mongols 1242. Andrew III. was the last male scion in the Arpád line; he died without issue 1301. During the mixed period, two kings, besides the governor Hunyady (q.v.) especially distinguished themselves. Lewis I., called the Great (reigned 1342–81), was the second king from the House of Anjou, being by his great-grandmother connected with the Arpád dynasty. He extended the sway of the Hungarian sceptre to limits formerly unknown; re-established at home the authority of law, trodden down by the mighty oligarchs under his predecessors; and promoted science, industry, and commerce. One of the remarkable episodes of his reign was the expedition to Italy to punish the assassins of his unfortunate brother, Andrew, spouse of the famous Joan of Naples. Sigismund (reigned 1387–1437) is better known as Emperor of Germany. A curious incident in the life of a sovereign, was his imprisonment at Siklós during six months; he was released only after he had taken the oath to his Hungarian subjects, vowing fidelity to the constitution. Mathias I.—better known by the name of Mathias Hunyady or Mathias Corvinus (see MATHIAS)—may be said to have been not only the greatest king of H., but also the greatest sovereign of his age; he reigned 1458–90. By his valor sagacity, and love of learning, he raised his nation to the pinnacle of fame. From the death of Mathias to the day of Mohács, H. exhibits the fiercest strife of factions—a protracted agony, preceding the loss of national independence. Among the many calamities during the reign of Vladislas II. of Bohemia (reigned 1490–1516), the Peasant War is prominent. Dózsa and his bands, after having committed great havoc, were exterminated by the famous John Zapolya of Transylvania, *and the whole of the peasantry reduced to a state of serfdom.* Lewis II. was but ten years old at the death of his father, Vladislas II. Another ten years of rapid disorganization was required to make a disaster like that of Mohács possible: see MOHÁCS, BATTLE OF. The further history of H. is indissolubly connected with that of the Austrian empire: for its principal features see AUSTRIA.

Fundamental Laws of Hungary.—1. The Golden Bull of Andrew II., given 1222, on the return of the king from Palestine, contains 31 articles, of which article 2 is a kind of Habeas Corpus Act, but for nobles only. One clause of article 31, declaring armed resistance to any illegal acts of the king not punishable by law, was cancelled by article 4 of the diet 1687.

2. Treaty of Peace of Vienna, 1606; concluded June 23 between Mathias II. and Stephen Bocskay. Article 1 enacts freedom of worship to Protestants, as far as is consistent with the established rights of the Rom. Cath. Church.

3. Treaty of Peace of Linz, enacted during the diet of 1646–7. Public worship is once more secured to Protestants, such freedom being for the first time extended also to the peasants. Protestants were to be admitted to public functions on an equal footing with Rom. Catholics.

4. The Pragmatic Sanction, contained in article 2 of the diet of 1722–3. In case there should be no male issue in the dynasty of Hapsburg, the females and their descendants are to succeed to the Hungarian throne. The king must be a Rom. Catholic, must take oath to the constitution, and sign the so-called *diploma inaugurale,* thus confirming the rights and privileges of the nation. Should there be no descendant, male or female, of the reigning House, the freedom of electing their king belongs to the nation.

Article 11 of 1741. Maria Theresa, abandoned by her allies, surrounded on all sides by fearful dangers, won the love of the Hungarian nation by acceding to their just and legitimate claims. The government of H. was confided to Hungarians only; in public affairs, the Primate, the Palatine, and the Ban were to be consulted. Hungarians were to be eligible for seats in the ministry. Article 17 of 1790-1 renews these enactments.

Article 10 of 1790-1 establishes the independence of the Hungarian kingdom with its annexed parts. *Article* 12 *of the same year declares that the power of making, changing, and interpreting laws in the kingdom of H. belongs to the sovereign legitimately crowned, together with the diet legally convened. Nothing can be done in H. by means of royal letters patent.* Article 13 orders that the diet shall be convoked at least once every three years.

Article 16 guarantees the nation the use and culture of the Magyar tongue.

Article 19 secures to the diet the right of voting taxes and of fixing the number of recruits.

Till 1848, the nobles were free from contribution and military service; they occasionally gave subsidies; and in case of extreme necessity, rose in arms for the defense of the country. Article 8 of 1847-8 enacts the great principle, that all classes are to participate in the public burdens of the realm. Article 9 abolishes statute labor; the peasants could thenceforward become owners of real property; and indemnity was given to their former masters. Article 5 of 1847-8 establishes the principle of popular representation on the basis of taxation.

In 1860, the decree of 1849, declaring that H. had by the rebellion forfeited its national constitution, was formally repealed, and the old constitutional system was restored. And 1867, June, the Emperor of Austria solemnly swore to maintain the constitution, and was crowned King of Hungary.

The Hungarian Reichstag or Diet consists of the House of Magnates and the House of Representatives. In 1879 the former had nearly 800 members. Of the 444 members of the latter, 334 represent H. proper, 1 Fiume, 75 Transylvania, and 34 Croatia and Slavonia. The lower House is composed of representatives of the towns and rural districts. It is elected by the votes of all citizens of age who pay direct taxes to the amount of 16s. a year. Neither electors nor their representatives are affected by any distinction of race or religion.

Hungarian Language and Literature.—Notwithstanding the general sympathy that prevails for H., many are of opinion that the Hungarians are but a half-civilized people, or that their language and literature are in some sense Germanic or Slavonic. But the Magyar tongue is as much distinct from German or Slave as is the French or Italian. The language of the Hungarians is called Magyar, and forms, with the Mogul, the group Ugri, belonging to the great Finnic family. As to its syntax, the language is nearest to the Turkish. Among its characteristics may be noted that the Christian name occupies always the second place; e.g. Hunyady János = John Hunyady. How rich in expressions, how abundant in classic beauties that language is, may be collected from the fact that though it was excluded from public life during eight centuries (Latin being used in schools, legislation, and administration), H. possesses to-day a literature, which, both in quantity and quality, will bear comparison with that of the most civilized western nations. Especially as regards poetry, the names of Kisfaludy, Vorösmasty, Petöfi, Arany, etc., are worthy of being ranked with the best in other lands. For further information on this interesting subject, consult Toldy's admirable *Handbook of Hungarian Literature,* published both in Magyar and in German.

HUNGARY, a. *hŭng'ga-rĭ* (also HUNGARIAN) pertaining to or obtained from Hungary. HUNGARY BALSAM, a kind of turpentine from the mountain-pine of Hungary. HUNGARY WATER, a distilled water; celebrated perfume, for whose preparation various receipts have been given. The following is one of the best: Take of fresh rosemary in blossom, 4 pounds; fresh sage in blossom, 6 ounces; ginger in slices, 2 ounces; cut them in small pieces, mix, and add rectified spirit 12 pounds, and common water 2 pints. Let 11 pints distil by a gentle heat. A hermit is said to have given the original receipt to a queen of Hungary, and hence it was called *Queen of Hungary's Water,* abbreviated into Hungary Water. It is employed principally as a perfume for the toilet; but it is sometimes taken internally as a restorative and stimulant, and it may be used externally as a gently stimulating liniment.

HUNGER, n. *hŭng'gėr* [AS. and Dan. *hunger;* Icel. *hungr,* hunger: Goth. *huhrus,* hunger—whence *hugrjan,* to hunger]: the uneasy sensation caused by want of food; desire for food (see DIGESTION); any eager or violent desire: V. to feel the pain of hunger; to crave food; to long for. HUN'GERING, imp.: N. the suffering from hunger. HUN'GERED, pp. *-gėrd:* ADJ. pinched by want of food; suffering from hunger. HUN'GERER, n. *-gėr-ėr,* one who. HUNGRY, a. *hŭng'grĭ,* having a keen appetite; feeling hunger; looking thin and eager; greedy; poor. HUNGRILY, ad. *hŭng'grĭ-lĭ.* HUNGERLY, a. ad. *hŭng'ger-lĭ,* in *OE.,* in want of nourishment. HUN'GER-BIT, a. *-bĭt,* or HUN'GER-BITTEN, a. *-bĭt'n,* pained or weakened from the effects of hunger. HUN'GER-STARVE, v. *-stârv* [Eng. *starve*]: in *OE.,* to starve with hunger; to pinch for want of food.

HUNINGEN, *hü'nĭng-en* (French *Huningue*): small town in s. Alsace, on the left bank of the Rhine, 37 m. s.s.e. of the town of Colmar. Pop. 2,000.

This place, still remarkable for its pisciculture, was formerly the centre of the French system. A series of buildings and artificial ponds, covering 70 imperial acres, was constructed 1852–54 for the breeding and acclimatizing of foreign fish. The total cost was abt. $50,000. The expense of carrying on the plan 1853–62, amounted to abt. $65,000, and the annual cost after the latter year averaged about $10,000. This establishment enabled the French govt. during the second empire to re-stock many of the barren rivers of France with valuable fish. See PISCICULTURE.

HUNKS, n. *hŭnks* [a probable corruption of *huckster*]: a covetous, miserly man; a niggard.

HU'NOOMAN: see HANUMAN.

HUNS, n. plu. *hŭnz* [*Hunni*, Gr. *Ounnoi* and *Chounoi*]: savage and powerful nation of n. Asia, which in the 5th c. overran a large portion of the Roman empire; eventually, under Attila, the most renowned of its leaders, bringing the empires of both the East and the West to the very verge of destruction.

The H. were of Asiatic origin, and, in all probability, of the Mongolian or Tatar stock; therefore akin to, and perhaps identified with, the Scythians and Turks. No close connection has been traced between the H. and the Magyars or Hungarians: the name H. seems to have been applied loosely to various tribes. According to De Guignes. whose theory was accepted by Gibbon, the H. who invaded the Roman empire, were lineally descended from the Hiong-nou, whose ancient seat was an extensive but barren country immediately n. of the great wall of China. About B.C. 200, these people overran the Chinese empire, defeated the Chinese armies in numerous engagements, and even drove Emperor Kao ti himself to an ignominious capitulation and treaty. During the reign of Vou-ti (B.C. 141–87) the power of the H. was much broken. Eventually, they separated into two distinct camps, one of which, amounting to about 50,000 families, went southward, while the other endeavored to maintain itself in its original seat. This, however, it was very difficult for them to do; and at length the most warlike and enterprising went w. and n.w. in search of new homes. This seems the beginning of the authentic history of the H. in Europe, abt. 372. Of those that went n.w., a large number established themselves for a while on the banks of the Volga. Then crossing this river, they advanced into the territories of the Alani, a pastoral people dwelling between the Volga and the Don. The Alani, who had long dwelt in these plains, resisted the incursions of the H. with much bravery and some effect, until in a bloody and decisive battle on the banks of the Don, the Alan king was slain, and his army utterly routed; after which the vast majority of the survivors joined the invaders.

The H. are described as of dark complexion, almost black; deformed in appearance, of uncouth gesture, and shrill voice. 'They were distinguished,' says Gibbon, 'from the rest of the human species by their broad shoulders, flat noses, and small black eyes deeply buried in the head; and as they were almost destitute of beards, they never enjoyed either the manly graces of youth, or the venerable aspect of age. A fabulous origin was assigned worthy of their form and manners—that the witches of Scythia, who for their foul and deadly practices had been driven from society, had copulated in the desert with infernal spirits; and that the H. were the offspring of this execrable conjunction.' Such was the origin assigned to them by their enemies the Goths, whom the H. (prob. abt. 374) invaded with fire and sword. Hermanric, aged sovereign of the Goths, whose dominions reached from the Baltic to the Euxine, roused himself to meet the invaders, but in vain. His successor, Withimir, encountered the H. in a pitched battle, in which he was slain, and his countrymen utterly routed. These now threw themselves upon the protection of Emperor Valens, who 376 gave permission to a great number of them to cross the Danube and settle in the countries on the other side as auxiliaries to the Roman arms against further invasion. The H. now occupied all the territories that had been abandoned by the Goths; and when these, not long afterward, revolted against Valens, the H. also crossed the Danube, and joined their arms to those of the Goths in hostilities against the Roman empire. In the wars that followed, the H. were not so conspicuous as the Goths their former enemies. Indeed, little is heard of the H. during the remainder of the 4th c. It is supposed, however, that early in the following century they were joined by fresh hordes of their brethren, and that this encouraged them to press on toward further conquests. In the reign of Theodosius the younger, they had increased so considerably in power, that their sovereign Rugilas, or Roas, was paid an annual tribute to secure the Roman empire from further injury.

Rugilas, dying 434, was succeeded in the sovereignty of the H. by his nephews Attila (q.v.) and Bleda. With Attila's death, however, 454, the power of the H. was broken in pieces. Soon afterward in a critical battle near the river Netad in Pannonia, 30,000 Huns and their confederates were slain. A few feeble sovereigns succeeded to him, but there was strife now everywhere among the several nations that had owned the firm sway of Attila, and the Huns especially never regained their power. Many took service in the armies of the Romans; others joined fresh hordes of invaders from the n. and e., aiding them in their repeated attacks on the moribund Roman empire.

HUNT, n. *hŭnt* [AS. *huntian,* to hunt; *hentan,* to pursue: Goth. *hunths,* captivity: Esthon. *hunt,* a wolf (see HOUND)]: the pursuit or chase of wild animals; pursuit; the pack of hounds: V. to chase or pursue wild animals; to follow closely. HUNT'ING, imp.: N. the act or practice of pursuing wild animals for sport or for food. HUNT'ED, pp. HUNT'ER, n. one who hunts; a strong horse trained for the chase. HUNT'RESS, n. *-rĕs,* a woman who hunts. THE HUNT, those who maintain a pack of hounds in any district. TO HUNT DOWN, to bear down by persecution or violence; to pursue closely with a view to seize upon, as a criminal. TO HUNT FROM, to drive out or away. TO HUNT OUT, AFTER, or UP, to seek; to search for. HUNTING-HORN, or BUGLE-HORN, a kind of bugle: in *her.*, a frequent bearing: when adorned with rings, it is said to be *garnished:* if the mouth and strings of the instrument are of different tincture from the horn, this must be named in blazon. HUNTING-BOX, or -SEAT, a residence for the convenience of hunting.

Hunting Horn.

Hunts'man, n. the servant who attends to the hounds, etc., a hunter.

HUNT, Helen: see Jackson, Helen Fiske (Hunt).

HUNT, *hŭnt*, Henry Jackson: 1819, Sep. 14—1889, Feb. 11; b. Detroit: soldier. He graduated at the U. S. Milit. Acad. 1839; was on frontier, garrison, and recruiting duty till 1846, June; served through the Mexican war where he was twice wounded and was brevetted capt. and maj. for gallantry; promoted maj. 1861, May; appointed aide to Gen. McClellan and commanded the artill. reserves in the Army of the Potomac in the peninsula campaign 1862; promoted brig.gen. of vols. 1862, Sep.; appointed chief of artill. of the Army of the Potomac the same day, and served as such to the close of the war; brevetted maj.gen. U.S.A. 1865, Mar. 13; promoted col. 5th U. S. artill. 1869, Apr. 4; retired 1883, Sep. 14; and appointed gov. of the Soldiers' Home in Washington 1885, retaining the office till death.

HUNT, James Henry Leigh: poet and essayist: 1784, Oct. 19—1859, Aug. 28; b. London; son of an English emigrant who had settled as a lawyer in Philadelphia and had married the daughter of a merchant there. The father being a loyalist had fled to England and taken orders in the church. H. was educated at Christ's Hospital, and attracted notice first as a writer of theatrical and literary criticisms for the *Examiner* newspaper, started 1805 by his elder brother John. At the age of 24, he became joint editor and proprietor of the *Examiner*. He was a liberal in politics before liberalism had become fashionable; and for one of his articles, reflecting on the obesity of the Prince Regent—'a fat Adonis of fifty,' H. had called him—he was sentenced to pay a fine of £500, and to undergo two years' imprisonment. H. was happy enough in his confinement; he hid the prison-bars with flowers, and received visits from Byron, Shelley, and Keats. On his release, he published *The Story of Rimini*, written in prison, which gave him a place among the poets of the day. *Foliage* appeared in 1818, and about the same time he started the *Indicator*, a serial suggested by the *Spectator* and *Tatler*. In 1828, he published *Lord Byron and his Contemporaries*, the record of a brief and not very pleasant companionship in Italy with his lordship, which gave great offense to Byron's friends. In the same year he started *The Companion*, sequel to *The Indicator*, both of which were republished as one book 1834. In 1833, he published a collected edition of his poetical works. In 1834, he started the *London Journal*, which he edited for two years. His principal works, besides those above mentioned, are—*Captain Sword and Captain Pen* (1835); *Legend of Florence* (1840); *The Seer*, similar to *The Indicator; The Palfrey* (1842); *Sir Ralph Esher*, novel (1844); *Imagination and Fancy* (1844); *Wit and Humor* (1846); *Stories of the Italian Poets, with Lives* (1846); *Men, Women, and Books* (1847); *A Jar of Honey from Mount Hybla* (1848); *Autobiography* (1850); *The Religion of the Heart* (1853); and *The Old Court Suburb* (1855). In 1847 he received from the crown a pension of £200, He died at Highgate. A selection from his *Letters and Correspondence* was published by his son, Thornton H., 1862.

H.'s reputation rests on his poems and essays. *The Story of Rimini* is, on the whole, perhaps the finest narrative which has appeared since Dryden, and his *Palfrey* is delightful from its good spirits and bright sunny glimpses of landscape and character. As an essayist, he is always cheerful and fanciful, and he looks determinedly at the bright side of things. He delights to wreath the porch of the human dwelling with roses and honeysuckles. His style is unhackneyed, and he had a refined critical perception, and a high poetic taste; though his work is sometimes disfigured by lapses into flippancy. Among his poems are several translations, which are among the best things of the kind. He transports the wine of Greece and Italy to England, and its color and flavor are improved rather than otherwise by the voyage.

HUNT, Richard Morris: architect: b. Brattleborough, Vt., 1828, Oct. 31. He began studying architecture in the United States, went to Europe 1843, entered the Paris School of Fine Arts, assisted Lefuel in erecting the buildings connecting the Tuileries with the Louvre, visited the art centres of the old world, returned to the United States 1855, and has since followed his profession. His chief works are the extension of the U. S. capitol; the Lenox library, Presb. hospital, *Tribune* building, Central Park entrances, and William K. Vanderbilt's house in New York; the Vanderbilt mausoleum on Staten Island; Yorktown monument; pedestal of Bartholdi's Statue of Liberty; theol. library and Marquand chapel, Princeton; divinity college and soc. buildings at Yale College; and numerous residences. He was appointed a chevalier of the Legion of Honor by the French govt. 1884.

HUNT, Thomas Sterry, ph.d., f.r.s., ll.d.: scientist: b. Norwich, Conn., 1826, Sep. 5. He studied medicine and chemistry, became asst. to Prof. Silliman in the Yale College laboratory 1845, was chemist and mineralogist to the geological survey of Canada 1847–72, prof. of chemistry in Laval Univ. 1856–62, and in McGill Univ. 1862–68, prof. of geology in the Mass. Institute of Technology 1872–78, and since 1878 has applied himself to technical authorship. He has published a series of papers on theoretical chemistry in the *American Journal of Science* (1848-51); *The Chemistry of the Earth* (Smithsonian pub. 1869); *A Century's Progress in Chemical Theory* (1874); *Chemical and Geological Essays* (1874); *Azoic Rocks* (1878); *Mineral Physiology and Physiography* (1886); *A New Basis for Chemistry* (1887); and *Mineralogy according to a Natural System* (1888); beside numerous reports and special papers. He was pres. of the American Assoc. for the Adv. of Science 1871, the American Institute of Mining Engineers 1877, the American Chemical Soc. 1880, and the Royal Soc. of Canada 1884; became a f.r.s. 1859; and received the degree ll.d. from McGill Univ. 1857 and Cambridge Univ., England, 1881, and sc.d. from Laval Univ. 1858.

HUNT, William Henry: eminent painter in water-colors: 1790, Mar. 28—1864, Feb. 10; b. London. He ranks very high in his profession; no less an authority than Mr. Ruskin pronouncing him among the greatest colorists of the English school. His subjects are very simple—*Peaches and Grapes, Old Pollard, Basket of Plums, Roses, Wild Flowers, Trampers at Home, A Farmhouse Beauty, Fast Asleep*, etc., but they are conceived in a finely poetical spirit, and present the perfection of finish.

HUNT, William Holman: painter: b. London 1827. He exhibited his first picture, *Hark!* 1846. During the next few years, his reputation steadily advanced; but while the young artist was winning fame, he was becoming more and more dissatisfied with the principles and practices that ruled his art; and with Millais, Rosetti, and other young painters who shared his convictions, he commenced a new style of treatment, known as the *Pre-Raphaelite*. This term, originated by H. and his friends, was employed by them to indicate their predilection for the painters who lived before Raphael, such as Giotto and Fra Angelico, but did not at all imply that they meant to take the productions of these masters as technical models. The truthfulness and earnest simplicity of the fathers of Italian art were the qualities which they admired. The first of H.'s works that showed the new influence, was his *Converted British Family Sheltering a Christian Missionary from the Persecution of the Druids* (1850). He afterward produced, among others, *Valentine Rescuing Sylvia from Proteus, The Hireling Shepherd, Our English Coasts, London Bridge on the Night of the Marriage of the Prince of Wales, The After-Glow, The Festival of St. Swithin, The Awakened Conscience, The Light of the World, The Scape-Goat, Christ Disputing with the Doctors in the Temple*, and the *Shadow of Death* (1873). The last four are perhaps H.'s greatest; and multitudes who do not care to understand the *vexata quæstio* of Pre-Raphaelitism, have been moved by their tenderness and religious truth.

HUNT, William Morris: 1824, Mar. 31—1879, Sep. 8; b. Battleborough, Vt.: artist. He took a partial course at Harvard College, entered the Royal Acad. at Düsseldorf to study sculpture 1846, abandoned that line of art for painting within a few months, and studied with Couture, Millet, and Barbizan in Paris, and returning to the United States established himself as artist and teacher in Boston 1855. Beside many portraits he painted *The Prodigal Son, The Drummer Boy, The Fortune Teller, The Choristers, Girl at the Fountain, Morning Star, Marguerita, Priscilla, Bugle-Call, The Bathers, Gloucester Harbor, Plowing, The Flight of Night*, and *The Discoverer*. In certain departments of art he gained great eminence. His lectures to scholars, reported by one of them, were published under the title *Talks on Art*, 2 vols. (1875).

HUNTER, *hŭnt'ėr*, DAVID: 1802, July 21—1886, Feb. 2; b. Washington, D. C.: soldier. He graduated at the U. S. Milit. Acad. 1822; was promoted 1st lieut. 1828, and capt. of dragoons 1833; engaged in business 1836–42; re-entered the army and served through the Mexican war; was appointed col. 6th U. S. cav. 1861, May 14, and brig.-gen. of vols. May 17; commanded a div. and was wounded at Bull Run July 21; promoted maj.gen. of vols. 1861, Aug. 13; succeeded Gen. Frémont in command of the w. dept. Nov. 21; contributed largely to the Union success at Fort Donelson; was transferred to the s. dept. 1862, Mar.; declared slavery abolished in his dept. Apr. 12, which order (as being unauthorized) was annulled by Pres. Lincoln Apr. 22; raised the first regt. of colored troops in the Union service; was pres. of the commission that tried the Lincoln conspirators 1865; brevetted maj.gen. U.S.A. 1865; and retired for age 1866, July 31.

HUNTER, JOHN: greatest name in the combined character of physiologist and surgeon that the annals of medicine can furnish: 1728, Feb. 13—1793, Oct. 16; b. Long Calderwood, Lanarkshire, Scotland; youngest of ten children. One of his brothers, William, claims a separate notice. One of his sisters, Dorothea, was married to Dr. James Baillie, prof. of divinity in the Univ. of Glasgow, and was the mother of Matthew Baillie (q.v.) and Joanna Baillie (q.v.). The fact that the father died when H. was only ten years of age, and the probability that he was over-indulged by his mother, explain why, at the age of 20 he could simply read and write, and was ignorant of every language except his own. The fame of his brother William's success as an anatomical lecturer, made H. desirous of entering the same profession, and he accordingly applied for and obtained the situation of assistant in the dissecting-room. His progress in anatomy and surgery was so rapid, that in the second session he was able to undertake the directing of the pupils in their dissections. He studied surgery under Cheselden (celebrated lithotomist), at Chelsea Hospital, during the summer months of 1749, 50; and subsequently under Pott.

In 1753, H. entered as a gentleman commoner at St. Mary's Hall, Oxford; but finally deciding on confining himself to the practice of surgery, he entered St. George's Hospital as surgeon's-pupil 1754, and two years afterward served the office of house-surgeon. In 1754 H. became a partner with his brother in the anatomical school. After ten years' hard work in the dissecting-room, his health began to give way, and in 1759 he was strongly advised to seek a more southerly climate. With this view he applied for an appointment in the army, was immediately made staff-surgeon, and sent out to Belleisle, and afterward to the Peninsula; but 1763, peace having been proclaimed, he returned home, permanently settled in London, and with nothing but his half-pay and his own talents to support him started as a pure surgeon. For a while he had not a great practice, and consequently devoted much time and money to comparative anatomy. He was in the habit of purchasing the bodies of animals that died in the Tower, and in travelling menageries; and in order conveniently to carry on his anatomical and physiological inquiries, he purchased a piece of ground at Earl's Court, Brompton, where he built a small house, in which he made most of his researches. In 1767, he was elected a fellow of the Royal Soc., and in the following year was appointed surgeon to St. George's Hospital. This appointment led to an increase of his practice, and enabled him to take pupils, each of whom paid him 500 guineas. Jenner (q.v.) was one of the earliest of these, and always spoke of his old master in terms of regard and affection. In 1771, he married Miss Home, sister of Mr. (afterward Sir Everard) Home. Mrs. Hunter had a taste for music, and was the author of several popular songs: *My Mother bids me bind my Hair* is one of hers, and was written to an air of Haydn's. H.'s practice at this time was increasing rapidly but his income never reached £1,000 a year until 1774. In 1773, he had the first attack of a disease (*angina pectoris*) which ultimately proved fatal. In 1776, he was appointed surgeon-extraordinary to the king.

In 1783, he determined to build a museum. The building, which was completed 1785, consisted of an upper room for the reception of his collection, 52 ft long by 28 wide, under which were a lecture-room, and another room which became the place of meeting of the Lyceum Medicum, a society established by H. and Fordyce. It was in Dec. of that year that he planned and carried into execution his famous operation for the cure of aneurism—that of simply tying the artery at a distance from the tumor, and between it and the heart, thus introducing into surgery an improvement which has been more fruitful in important results than any since Ambrose Paré's application of ligatures to divided arteries. In 1786, H. was appointed deputy-surgeon-gen. to the army; in 1787 he rereceived the Copley medal from the Royal Society. He was now universally acknowledged, by all the younger surgeons, as the head of the profession; but most of his contemporaries looked on him as little better than an innovator and an enthusiast. He died of spasmodic heart attack, and was buried in the church of St. Martin's-in-the-Fields, whence his remains were removed, 1860, to Westminster Abbey, where a suitable tablet to his memory has been erected by the Council of the Royal College of Surgeons.

Some idea may be formed of H.'s extreme diligence, by the fact that his museum contained at the time of his death 10,563 specimens and preparations illustrative of human and comparative anatomy, physiology, pathology, and natural history. He died in comparative poverty, and his collection was purchased, two years after his death, by government for £15,000, and was presented to the Royal College of Surgeons, by whom it has been much enlarged.

In addition to numerous papers contributed to the *Transactions* of the Royal and other learned societies, he published the following independent works: *A Treatise on the*

Natural History of the Human Teeth (part i. 1771; part ii. 1778); *A Treatise on the Venereal Disease* (1786); *Observations on Certain Parts of the Animal Economy* (1786); and *A Treatise on the Blood, Inflammation, and Gunshot Wounds* (1794). Mr. Palmer, with the literary assistance of several eminent surgical friends, published an excellent ed. of *The Works of John Hunter, F.R.S., with Notes*, in 4 vols., 1835. To this is prefixed *The Life of John Hunter, F.R.S.*, by Drewry Otley, from which most of the materials of this sketch have been taken.

HUNTER, WILLIAM, M.D.; 1718, May 23—1783, Mar. 30; b. Long Calderwood, parish of Kilbride, Lanarkshire, Scotland; elder bro. of John H. After studying for five sessions in the Univ. of Glasgow, with a view to the profession of the ministry, he turned to that of medicine. He passed the winter session 1740-1 in Edinburgh, and in the summer of 1741 went to London. H. was then entered as a surgeon's pupil of St. George's Hospital, and as a dissecting pupil of Dr. Frank Nicholls, teacher of anatomy. To teach anatomy was now the object of his ambition. In 1746 an opportunity was presented to him, through an appointment to teach a society of naval surgeons. In 1747, H. was admitted a member of the Corporation of Surgeons. In his early career, he practiced both surgery and midwifery, but he gradually confined himself to the latter. He was appointed one of the surgeons-accoucheur to the Middlesex Hospital 1748, and to the British Lying-in Hospital 1749.

In 1762, H. was consulted by Queen Charlotte, and two years afterward was appointed physician-extraordinary to her majesty. In 1767, H. was elected a fellow of the Royal Soc., and in the following year was appointed prof. of anatomy to the Royal Acad. In 1770 he removed to Great Windmill Street, where he had built a house, in connection with a roomy amphitheatre for lectures, a dissecting-room, and a magnificent room for his museum, which consisted of anatomical preparations executed by himself and his pupils, purchases from other museums, also minerals, shells, and other objects of natural history, with a very rare cabinet of ancient medals and coins.

An estrangement which took place between H. and his brother John continued till H. was on his death-bed, when his brother requested that he might be admitted to see him. This was acceded to, and he continued to visit him daily, and to afford him professional assistance, until his death. Together with the bulk of his fortune, H. left his museum to Dr. Baillie for a period of 30 years, after which it was to be transferred to the Univ. of Glasgow, to which institution he bequeathed £8,000 for its maintenance and increase.

H. excelled as a lecturer in clearness of arrangement, aptness of illustration, and elegance of diction. 'He was, perhaps, the best teacher of anatomy that ever lived.' He published several important contributions to medicine, of which the most important appeared in its perfect form after his death, *Anatomical Description of the Human Gravid Uterus and its Contents.*

HUNT'ER RIVER: in New South Wales, entering the Pacific 75 m. n. of Sydney.

HUNT'ER'S POINT: see LONG ISLAND CITY.

HUNTINGDON, *hŭnt'ing-don:* borough, cap. of H. co., Penn.; on the Juniata river; 34 m. e of Altoona, 104 m. w. of Harrisburg, 151 m. e. of Pittsburg, 202 m. w. of Philadelphia. Its vicinity abounds in fine timber, coal, iron, lead, limestone, and fire-clay. It contains flouring and planing-mills, gas and water-works, car-works, broom, furniture, and boot and shoe factories, brick-yards, and tanneries; 12 churches, United Brethren Normal College, acad., and select school; 1 national bank (cap. $100,000), 2 private banks, and several weekly and monthly newspapers. Pop. (1870) 3,034; (1880) 4,125.

HUNTINGDON, *hŭnt'ing-don:* market-town and parliamentary and municipal borough of England, cap. of the county H.; on the left bank of the Ouse. H. is connected with its suburb Godmanchester by a bridge over the Ouse. It has connection with the Great Northern and Great Eastern railways. There are 3 established churches, 4 dissenting chapels, and numerous schools, one of which is the Grammar-school (recently renewed), with two exhibitions for Cambridge Univ. There are large brick-works, two breweries, and an iron-foundry. The house of Oliver Cromwell is of historical interest. Pop. of parl. bor. (1871), 6,606; of mun. bor. 4,243; (1881) 6,417, and 4,229.

HUNT'INGDON, SELINA, Countess of: 1707, Aug. 24—1791, June 17; b. at Stanton-Harold, a mansion near Ashby-de-la-Zouch, Leicestershire; second of three daughters and co-heiresses of Washington Shirley, second Earl Ferrars. She married 1728, Theophilus, 9th Earl of Huntingdon, and became a widow 1746, Oct. Adopting the principles of the Calvinistic Methodists, founded by the famous George Whitefield, she made that eminent preacher one of her chaplains, and assumed a leadership among his followers, who came to be known as 'The Countess of Huntingdon's Connection.' On Whitefield's death 1770, she was appointed by his will sole proprietrix of all his possessions in the province of Georgia, on which she immediately set about organizing a mission to N. America. Her labors increased with her years. For the education of ministers, she established and maintained a college at Trevecca, in Wales, removed, 1792, to Cheshunt, Herts; and built, or became possessed of, numerous chapels in different parts of the country, the principal one being at Bath. She likewise expended large sums in the support of young men trained to itinerant preaching, as well as in private charity. But with all her excellences, she was not indisposed to play the part of a female pope, and had a passion for carrying her point. By her will, 1790, Jan. 11, she created a trust, bequeathing her chapels to four persons, of whom Lady Anne Erskine, daughter of the Earl of Buchan, was one, for their care and management after her death, when the number amounted to 64. Most of them have become, in doctrine and practice, identical with the Congregational body.

There are now about 40 chapels belonging to this connection in England and Wales.

HUNTINGDONSHIRE, *hŭnt'ĭng-don-shėr*, or **HUNTS**, *hŭnts:* small inland county of England; bounded e. by Cambridgeshire, s. by Bedfordshire, and w. and n. by the county of Northampton; 229,515 acres, almost the whole of which is arable or in pasture. Pop. (1871) 63,708; (1881) 59,491. It is watered chiefly by the Ouse, which flows n.e. through the s. part of the county; and by the Nene, which skirts its n. boundary. In the s. districts the surface is diversified by low hills; the n. portion of H. however, is included in the great fen-country. The soil is various; clay, however, predominates generally. Grain, with beans, rape, and clover are the chief crops. The county returns two members to the imperial parliament.

The county of H. was traversed by two Roman roads, and Roman remains, as coins, pottery, etc., have been found.

HUNTINGTON, *hŭnt'ĭng-ton*, DANIEL: artist: b. New York, 1816, Oct. 14. He was educated at Hamilton College, began studying painting with Samuel F. B. Morse 1835, spent 1836–39 sketching in the Hudson Highlands, studied and painted figure-pieces in Rome, returned to New York and painted portraits and made drawings for book illustrations till his eye-sight failed, spent 1844–46 in Europe, and since 1846 has been engaged in portrait and historical painting in New York. He became an associate of the National Acad. of Design 1839, academician 1840, and pres. 1862–69 and 1877. His works include: *Early Christian Prisoners; Christiana and her Children; Queen Mary Signing the Death Warrant of Lady Jane Grey; Henry VIII. and Catharine Parr; Lady Jane Grey and Feckenham in the Tower; The Republican Court in the Time of Washington; The Narrows, Lake George; Clement VII. and Charles V. at Bologna;* and *Goldsmith's Daughter.*

HUNTINGTON, FREDERIC DAN, D.D., LL.D.: Prot. Episc. Bishop; b. Hadley, Mass., 1819, May 28. He graduated at Amherst College 1839, and the Cambridge Divinity School 1842; was pastor of the South Congl. Church (Unit.), Boston, 1842–55; Plummer prof. of Christian morals, and preacher in Harvard College 1855–60; ordained deacon in the Prot. Episc. Church 1860, Sep. 12, and priest 1861, Mar. 19; organized and was rector of Emmanuel parish, Boston, 1860–69; and was consecrated first Prot. Episc. bp. of Central New York 1869, Apr. 8. He was a founder and for many years editor of the *Church Monthly*, has published a large number of sermons and addresses, wrote the *Pastoral Letter* for the gen. convention of 1883, and received the degree D.D from Amherst College 1856 and LL.D. from the same 1887.

HUNTINGTON, JEDIDIAH: 1743, Aug. 4—1818, Sep. 25; b. Norwich, Conn.: soldier. He graduated at Harvard College 1763, joined his father in commercial business, raised a regt. for the army at Cambridge 1775, was at the repulse of the British at Danbury 1776, Apr.; appointed brig.gen. 1777, May 12; served in the courts that tried Gen. Charles Lee and examined John André, brevetted maj.gen. after the war, and was collector of customs at New London 1789–1815.

HUNTINGTON, Samuel, ll.d: 1731, July 3—1796, Jan. 5; b. Windham, Conn.; signer of the Declaration of Independence. He received a limited education, learned the cooper's trade, studied law, was admitted to the bar 1758, was member of the Conn. gen. assembly 1764, appointed king's attor. 1765, member of congress 1776–83 and its pres. 1779–81, judge of Conn. supreme court 1774–84, chief justice 1784, lieut.gov. 1785, and gov. 1786–89. He received the degree ll.d. from Dartmouth College 1785 and Yale College 1787.

HUNTINGTON, William Reed, d.d.: Prot. Episc. clergyman; b. Lowell, Mass., Sep. 20, 1838. He graduated at Harvard College 1859; was acting prof. of chemistry there 1859–60; took orders in the Prot. Episc. Church 1860; was asst. to his relative, Frederic Dan H., d.d., in Emmanuel Church, Boston, 1861–62; rector of All Saints', Worcester, Mass., 1862–83; and succeeded Asst. Bish. Henry C. Potter as rector of Grace Church, New York, 1883. He received the degree d.d. from Columbia College 1873.

HUNTLY, *hŭnt'lĭ:* small burgh or barony and market-town of Scotland, in the n.w. of Aberdeenshire, at the junction of the Bogie and the Deveron, 20 m. s.s.w. of Banff. In the vicinity is the ruin of H. Castle. Pop. (1871) 3,570; 1881) 3,519.

HUNTSVILLE, *hŭnts'vĭl:* city, cap. Madison co., Ala.; on the Memphis and Charleston railroad; 10 m. n. of Tennessee river, 98 m. w.s.w. of Chattanooga, 165 m. n. of Montgomery, 212 m. e. by s. of Memphis. It occupies an elevated site on the Cumberland Mountains, is one of the most thriving places in n. Ala., and is known as 'the queen city of the mountains.' Its industries embrace brass and iron foundries, railroad machine-shops, flouring and planing-mills, and sash and blind-factories; and it contains H. Female Seminary (Presb., organized 1829), H. Female College (Meth. Episc., organized 1853), normal school for colored teachers, 11 churches, 1 national bank (cap. $50,000), 1 private bank, gas and water-works, and several tri-weekly and weekly newspapers. Pop. (1870) 4,907; (1880) 4,977.

HUNYADY, *hôn'yŏd-ĭ,* János (Eng. John): governor of Hungary, one of the greatest captains of his age; b. near the close of the 14th c.; d. abt. 1448. H.'s origin is wrapped in mystery, the most accredited legend being that he was son of Emperor Sigismund by a Wallachian lady. H. and his descendants had in their escutcheon a raven—*corvus*—hence the designation Corvinus. We find H. as Ban of a province s. of the Danube, distinguishing himself against the Turks, who at that time were the terror of the whole of Christendom. During 1437–56, H. was the shield of Hungary, not only against external foes but also against the lawless attempts of the nobles. Such was the renown of H.'s arms that, after the campaign of 1444, the Turks were glad to obtain an armistice of ten years. The vacillating Vladislas I. allowed himself to be induced by the papal legate, Julian Cæsarini, to break the peace that he had sworn to keep. H. was defeated in the bloody battle of Várna, 1444; the king perished in the fight, as also the cardinal legate; H. was captured during his flight by the voivod of Wallachia; but on a declaration that the whole of Hungary would rise to deliver the noble prisoner, was safely escorted to the frontier, and there set free. During the minority of Ladislaus V. (son of Vladislas I.), H. was elected by the nation gov. of Hungary. The battle of Rigómagö (1447), one of the bloodiest ever fought, was lost through the treason of the voivod of Wallachia; H. had once more to go through a short captivity. But the most splendid of his deeds was the storming of Belgrade, where the monk, John Capistran, carrying the holy cross, raised the enthusiasm of the Christian warriors to such a height, that a most complete victory brought that fortress again into the possession of the Hungarians. Shortly afterward dysentery broke out in the camp, and H., the great Christian hero, after a short illness, fell a victim to the disease. Capistran, 70 years old, followed his friend into the grave two months later. H. left two sons, Ladislaus and Mathias (q.v.)—the former of whom was treacherously imprisoned, and beheaded at Buda, by the very prince whom his father had so faithfully served, Ladislaus V.; the latter was given in charge to George Podiebrad (q.v.) of Bohemia.

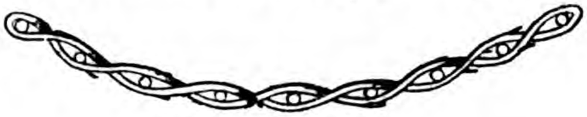
HUPEH, *hô-pā:* one of the central provinces of China, reputed the most fertile; 70,450 sq. m. The cap. is Wuchang. The grear river Yangtse, recently opened to foreign commerce, flows through the s. of the province, where it receives tributaries from various lakes on either side, nearly doubling its volume of water. Pop. 27,370,098.

HURA, *hū'ra:* genus of plants of nat. ord. *Euphorbiaceæ. H. crepitans*, a native of the W. Indies and tropical America, is a tree abounding in a very acrid milky juice; with stalked, heart-shaped, acuminate, leathery leaves. The fruit is a woody capsule, of the size of a large apple, very much flattened, formed of 12–15 *cocci*, each containing a large seed, surrounding a common axis, which separate with great elastic force. Before the use of blotting-paper became general, the capsule was generally used in the W. Indies as a sand-box—whence the tree is called SAND-BOX TREE—for powdering letters with fine sand; but it was found necessary to bind it with a hoop of iron, as even after being used for years it would sometimes burst with a report like that of a pistol. The seeds are a violent drastic purgative.

HURD, *hėrd*, RICHARD, D.D.: 1720, Jan. 13—1808, May 28; b. Congreve, Staffordshire: English prelate. He studied at Cambridge Univ., of which he became a fellow 1742. In 1749 appeared his first notable production, *Commentary on*

Horace's Ars Poetica. In 1750, on Warburton's recommendation, he was appointed one of the Whitehall preachers. He afterward became Bp. of Litchfield and Coventry, and 1783 declined the archbishopric of Canterbury. His principal works are—*Dialogues on Sincerity, Retirement, The Golden Age of Elizabeth and the Constitution of the English Government* (1759); *Letters on Chivalry and Romance* (1762); and *An Introduction to the Study of the Prophecies concerning the Christian Church* (1772). Hallam says of H., that he 'has perhaps the merit of being the first who, in this country, aimed at philosophical criticism.' See H.'s works, with Life, 8 vols. (1811).

HURDLE, n. *hėr'dl* [Dut. *horde*, a fence of branches or osiers: Ger. *hürde*, a frame of rods or wicker-work: Icel. *hurd*, a wicker-gate: Swiss, *hurd*, a pole: F. *hard*, a withe]: a framework of intertwined twigs or the smaller branches of trees; a crate; the rough framework on which criminals were dragged to execution: V. to enclose or guard with hurdles **HURDLING**, imp. *hėrd'ling*. **HURDLED**, pp. *hėr'dld*. **HURDLES**, n. plu. *hėr'dlz*, frames for fencing, etc. In military affairs, straight flat rectangles of strong wicker-work, about 6 ft. long, and 2 ft. 9 inches high. They are useful in many ways, both in military and civil life, either as fencing, as barriers; or in fortification, in the construction of *hurdle-batteries*, which were the invention of Sir William Congreve, who devised them as the speediest means of throwing up earthworks: three hurdles are fastened at their ends in the form of a triangle, and the central space is filled in a short time with earth. These triangles can be constructed to any ground-plan, and with their aid, a body of soldiers can entrench themselves in a few minutes. The hurdle is composed of wattles interwoven (as shown in the diagram) around stakes or pickets, the latter during the manufacture being fixed upright and firmly in the ground.



Hurdle-weaving.

HURDS, or **HARDS**, n. plu. *hėrdz* [AS. *heordas*, the refuse of tow]: the coarse part of flax or hemp; any waste tow or oakum.

HURDWAR, *hėrd-wâr'* (rather **HARDWÂR**, i.e. *Haridwára*, Vishnu's gate): perhaps the most famous spot on the Ganges, on the right or w. bank of the river at the point where it emerges from the sub-Himalaya into the plains of Hindustan. It is 1,024 ft. above sea-level, in Saharumpur, N.W. Provinces. From its position on the sacred stream, it attracts immense numbers of pilgrims for ablution. The orthodox season comprises the end of March and the beginning of April—a great fair at the same time engrafting commerce on religion. In ordinary years, the attendance is about 100,000; but every twelfth year (as in 1879, 91, etc.), a peculiarly sacred feast takes place, attended by perhaps 300,000 (formerly by as many as 2,000,000). Pop. 5,000.

HURDYGURDY, n. *hėr'dĭ'gėr'dĭ* [imitative of its grinding rough tones: Scot. *hur*, to snarl; *gurr*, to growl]: very old musical stringed instrument, which, under the name Leyer, or Baurenleyer, spread from its native country, Germany, over a great part of Europe. The H.-G. consists of a flat, oval-shaped sounding-board, over which the strings are stretched, with a back or bottom of the same size and shape. These are bound together by deep sides, or ribs. On one side are 10 to 12 finger-keys, for shortening the sounding lengths of the strings when required. There are four strings, of gut, put into a state of vibration by being rubbed by the edge of a small wooden wheel charged with rosin and turned by a handle. Two of the strings are tuned in unison as a key-note, or one of them a fifth above; they are placed out of reach of the keys, and form a sort of drone-bass. The other two strings are acted on by the keys, and produce a diatonic scale of 10 to 12 notes. The H.-G. is suited only to simple music, and was used for such as had many repetitions. Its simplicity and cheapness made it formerly a favorite among the peasantry of Europe. The name is now often used of the barrel-organ (q.v.), or of a kind of mechanical piano.

HURKARU, n. *hŭr-kâr'ô:* in the *East Indies*, a running footman; a messenger; a Calcutta daily paper so called.

HURL, v. *hėrl* [Sw. *hurra*, to whirl: Dan. *hurre*, to hum or buzz: Swiss, *hurrli*, a humming-top (see Whirl)]: to drive through the air with a whirring noise; to throw with violence; to drive with great force; to whirl: N. the act of hurling; a tumult. Hurl'ing, imp. Hurled, pp. *hėrld.* Hurl'er, n. *-ėr*, one who.—Syn. of 'hurl, v.': to drive; throw; cast; toss.

HURL, v. *hėrl* [F. *hurler*, to howl, to shriek]: to howl; to shriek, as 'to hurl defiance;' to utter with vehemence; to scream. Hurl'ing, imp. Hurled, pp. *hėrld.* *Note.*—Hurl, in this sense, is uniformly placed in dictionaries under Hurl 1, 'to utter, throw, or drive with vehemence': surely the sense *howl* or *shriek* comports much more effectively with such expressions, 'hurling defiance' = 'howling or shrieking defiance,' 'he hurls out vows' = 'he *screams* out vows'—see Latham, under Hurl. Without doubt, however, the senses of Hurls 1 and 2, expressing nearly identical ideas, have become confused, for we have the analogous expressions, 'to cast reproach' and 'to throw taunts.'

HURL, n. *hėrl* [Scot., connected with Whirl, which see, and Hurl 1]: in *Scot.*, a drive in a conveyance or cart: V. to drive or drag a small hand-conveyance; to be driven in a conveyance. Hurley, n. *hėr'lĭ*, a small two-wheeled conveyance that can be driven with the hands; a hand-cart.

HURLY, n. *hėr'lĭ* [imitative of the sound of bodies *whirring* or moving rapidly through the air]: in *OE.*, bustle; tumult; commotion. **HURLY-BURLY**, n. *-bėr'lĭ*: great commotion: ADJ. creating confusion; tumultuous, see HULLABALOO.

HURON, *hū'ron*, LAKE: third in size of the five 'great lakes' of N. America; lat. 43° 5'—46° 15' n., long. 79° 30' —84° 50' w.; between Lake Superior on the n.w., Lake Michigan on the n.w. and w., and lakes Erie and Ontario on the s. and s.e.; length n. to s. 260 m., on the s.w. coast 360 m.; breadth (greatest) e. to w. 160 m., but excluding Georgian Bay on the n.e., only 90 m.; circumference 1,100 m.; area 21,000 sq. m.; surface elevation 19 ft. above Lake Erie, 352 ft. above Lake Ontario, 578 ft. above sea-level; depth, greatest, about 1,800 ft., average 1,000. The water, coming from numerous streams, is clear and cold, and the navigation season is between May 1 and Dec. 1. The boundary line between the United States and Canada extends 225 m. along the middle of the main body, then through the middle passage between Lesser Manitou and Drummond's Islands, and curves to the n, and w. 25 m. to the entrance of St. Mary's river. The lake receives the waters of Lake Superior by St. Mary's river, those of Lake Michigan by the Straits of Michilimackinac, of Lake Nipissing on the n. by Francis river, and of Lake Simcoe on the e. by Severn river, and discharges its own waters by the St. Clair river. Its bays and harbors are more numerous than those of any other of the 'great lakes.' The most important are Saginaw Bay, extending into Michigan; Georgian Bay, s.e. of the Manitou Islands, about 170 m. long by 70 wide, nearly one-fourth the area of the whole lake; and Manitou Bay, or the North Channel, n. of Manitou Islands. The lake contains many thousands of islands, some estimates reaching 32,000; of which, 3,000 are considerable in size. The Manitou group, of which Great Manitoulin (90 m. long and 30 m. wide) is the largest, extend from a peninsula in the s.e. to the n., and with Drummond's Island separate another sheet of water from the main lake, Manitou Bay, 80 m. long and 20 m. wide. Lake H. is subject to violent storms, but navigation is not considered dangerous.

HURO'NIAN-ROCKS, or **HURONIAN-FORMATION**: in *geol.*, name given by Sir Wm. Logan to a series of strata in the vicinity of Lake Huron, consisting chiefly of quartzite with great masses of greenish chloritic schist, sometimes containing pebbles derived from the Laurentian rocks. These are about 18,000 ft. thick. No organic remains have yet been found in them, and limestones are rare, though one has been found 300 ft. thick, which may yet be proved originally to have had connection with organic life. They are believed to be of Lower Cambrian age, and lie unconformably on the Laurentians.

HU'RON IN'DIANS: see WYANDOTS.

HURONITE, n. *hū'ron-īt* [named from Lake *Huron*]: variety, or sub-variety, of fahlunite; a yellowish-green mineral, with waxy or pearly lustre occurring in hornblendic bowlders near Lake Huron.

HURRA! or **Hurrah!** int. *hûr-râ′:* an exclamation expressive of pleasure or satisfaction; a shout of triumph or applause; the characteristic war-cry or cheer of English soldiers and sailors, and of those of the United States, as they go into action or make a charge.

HURRICANE, n. *hŭr′rĭ-kān* [Sp. *huracan;* OF. *houragan;* F. *ouragan,* a hurricane—from a native Amer. word imitative of rushing wind: comp. Gael. *uair-a-cuan,* a tempest of the sea]: violent storm in which the wind blows fitfully with prodigious force. Hur′ri-ca′no, n. *-kā′nō,* in *OE.,* same sense.—See Storms: Wind: Whirlwind: Cyclone: Typhoon.

HURRIED, a., **HURRIES,** n.: see under Hurry.

HURRUR′: see Harar.

HURRY, v. *hŭr′rĭ* [O.Sw. *hurra,* to swing, to whirl: Icel. *hurr,* a noise: Swiss, *hurrsch,* a word intended to express rapid action accompanied by a whizzing sound: O.H.G. *hursc,* quick: Ger. *hurtig,* quick, brisk: *arri! harri!* cries in France and Italy to urge on horses]: to hasten; to impel to greater speed; to put into confusion through haste; to move or act with haste: N. haste; a driving or pressing forward, as on business; bustle. Hur′rying, imp. *-rĭ-ĭng:* Adj. hastening; quickening: N. the urging to greater speed; rapidity of motion. Hur′ried, pp. *-rĭd:* Adj. hastened; urged to rapid motion or vigorous action. Hur′riedly, ad. *-lĭ.* Hur′riedness, n. Hur′rier, n. *-rĭ-ėr,* one who. Hur′ryingly, ad. *-lĭ.* Hurries, n. plu. *hŭr′rĭz,* stages or frames at the sides of a quay for the convenience of tumbling coals from the wagons right into the holds of sea-going vessels. Hur′ry-skur′ry, ad. *hŭr′rĭ-skŭr′rĭ* [imitative of scampering and rushing about]: confusedly; in a bustle: N. confusion and bustle.—Syn. of 'hurry, v.': to precipitate; expedite; quicken; accelerate; speed; dispatch; bustle.

HURST, or Hyrst, n. *hėrst* [Dut. *horst,* a bushy place: Swiss, *hurst,* a thicket]: a wood or grove; a postfix in names of places in same sense, as in Hawkhurst; in *her.,* a charge representing a small group of trees, generally borne upon a mount in base.

HURST, *hėrst,* John Fletcher, D.D., LL.D.: Meth. Epis. bishop: b. Dorchester co., Md., 1834, Aug. 17. He graduated at Dickinson College 1854; studied theol. at the universities of Halle and Heidelberg; entered the ministry of the Meth. Epis Church 1858; was prof. of theol. in the Martin Mission Institute, Bremen, 1866–70; prof. of historical theol. in Drew Theol. Seminary, N. J., 1871–73, and its pres. 1873–80; and elected bp. 1880, May 12. He has travelled extensively on work of his church in the United States, Europe, and India; has published numerous translations and original works, and received the degree D.D. from Dickinson College 1866, and LL.D. from the same 1877 and Ind. Asbury University.

HURT, n. *hėrt* [Dut. *horten;* F. *heurter;* OF. *hurter;* It. *urtare,* to dash against: W. *hwrdd,* a stroke, a blow;

comp. Gael. *goirteas*, pain, suffering]: a wound; a bruise; injury: V. to give or cause pain to; to wound; to grieve; to injure. Hurt'ing, imp. Hurt, pt. and pp. *hèrt.* Hurt'ers, n. plu. *-èrz*, pieces of wood for protecting the parapet from the wheels of gun-carriages. Hurt'ful, a. *-fûl*, injurious; pernicious; occasioning loss or injury. Hurt'fully, ad. *-lĭ.* Hurt'fulness, n. Hurt'less, a. *-lĕs*, in *OE.*, that cannot hurt; harmless; innocent.—Syn. of 'hurt, n.': damage; detriment; harm; prejudice; injustice; wrong; mischief; loss; bane; disadvantage;—of 'hurtful': mischievous; destructive; harmful; baneful; prejudicial; detrimental; disadvantageous; noxious; unwholesome.

HURTERS, or Heurters, n. plu. *hèrt'èrz:* see under Hurt.

HURTLE, v. *hèrt'l* [a dim. of *hurt:* F. *heurter*, to dash against: Norw. *hurra*, to rattle: an imitative word]: to clash or dash together; to rattle; to move violently. Hurt'ling, imp.: N. the act of that which hurtles; the rattling, clashing noise sometimes made by a rapidly moving body. Hurtled, pp. *hèrt'ld.*

HURTLE-BERRY, n. *hèrt'l-bĕr'rĭ* [AS. *heort-berie*, hartberry]: the whortle-berry—which see.

HUSBAND, n. *hŭz'bănd* [Icel. *húsbúandi*—from *hus*, a house; *búandi*, dwelling: AS. *husbonda*, the master of the house—from AS. *hus*, a house; *bonda;* Lap. *banda*, a master: Bohem. *hospod;* L. *hospit'*, the lord, the master of the house]: a man joined to a woman by marriage (see Husband and Wife); an economist; the manager of the concerns of a ship, as in the phrase *ship's husband:* V. to manage with frugality; to use with economy. Hus'banding, imp. Hus'banded, pp. Hus'bandman, n. the man who manages the concerns of the soil; a tiller of the soil; a working farmer. Hus'bandry, n. *-bănd-rĭ*, the business of a farmer; frugality; domestic economy. Hus'bandless, a. without a husband. Hus'bandage, n. *-bănd-āj*, the agent's allowance or commission for attending to the business of a ship.—Syn. of 'husbandman': farmer; master; cultivator; tiller; agriculturist.

HUSBANDRY, *hŭz'band-rĭ*, Patrons of: secret order in the United States, founded in Washington, D. C., 1867, Dec. 4, for the purpose of promoting the interests of persons engaged in agricultural pursuits, and in business connected therewith. The motive was the general depression of the industries allied to the cultivation of the soil following the civil war. William Saunders, supt. of the gardens and observatories of the agricultural bureau at Washington, becoming familiar with the reports received by the bureau from the various farming regions of the country, and impressed with the results of co-operative labor as shown by the Masonic and Odd Fellow orders, conceived the idea that an application of some of the principles on which those orders had flourished would unite the discouraged farmers and lead to their advancement. After consulting with O. H. Kelley, J. R. Thompson, William M.

Ireland, the Rev. A. B. Grosh, and the Rev. John Trimble, Jr., all connected with the depts. at Washington, a ritual was prepared on the basis of those of the Masonic and Odd Fellow orders, and the first body, the National Grange, was organized, with Saunders as master, Thompson, lecturer, Anson Bartlett, overseer, William Muir, steward, A. S. Moss, asst. steward, Grosh, chaplain, Ireland, treas., Kelley, sec., and Edward P. Faris, gatekeeper. To these were subsequently added four offices for women, bearing the titles Ceres, Pomona, Flora, and Lady Asst. Steward. Then followed, with the expansion of the order, the institution of state and subordinate granges; the establishment of grange libraries, comprised wholly of books and periodicals bearing on the agricultural industries; the opening of depots for the co-operative purchase and sale of all needful articles; the assumption by state or subordinate granges or trusted individual members of the functions of the usual middle-men; railroad legislation to promote the interests of producing shippers; and a variety of reforms that could never have been reached by the individual farmer. The principles of the order prohibit any political discussion, agitation, or other work under the name of the order; a wise provision, as the growth of the organization soon excited the attention of professional politicians, who have frequently attempted to gain personal or party benefit through its large and far-reaching membership. It is believed that the acting subordinate granges number 50,000, with upward of 4,000,000 members (1889); and the order has been extended into the farming portions of Canada with beneficial results.

HUSBAND AND WIFE: correlative terms designating the man and woman united in a marriage. For modes of contracting marriage, with the accompanying ceremonies and the impediments to marriage, see MARRIAGE: for the mode of dissolving marriage, see DIVORCE. Marriage is often spoken of as a mere civil contract. This view is incorrect, because too narrow. Marriage is a relation voluntarily assumed by the parties, not to be broken off or dissolved at the whim of either or both, but to last for life. Whether the relation be divinely ordained or not, the interests of society, of unborn children, of morality, create rights and obligations flowing out of marriage and enforced by laws which never could arise from mere contract. Indeed it may be doubted whether marriage is a contract at all. In the language of Judge Story 'it is rather to be deemed an institution of society founded upon the consent and contract of the parties.'

I. *Property Rights.*—In respect to property rights growing out of the marriage relation, the law is in an unsettled and transition state. The Common Law of England regarded husband and wife as one person, and as an eminent writer facetiously observes, that person was the husband. (Schouler, *Husband and Wife*, p. 9).

The condition of the wife during marriage was by this system denominated *coverture*, she being called *feme-covert*, meaning, under the wing, protection, or *cover* of her husband. He was called her *baron* or lord. So far as the husband's property was concerned, the wife became entitled to no part thereof, except to inherit a part of his personalty, and a dower right in his real estate. And of this personalty he could deprive her by his last will and testament. He, on the contrary, by marriage became absolutely entitled to her personal property, which at his death he might dispose of as he saw fit. He also became entitled to the profits of the wife's lands during the marriage, and if a child was born during the marriage and the husband survived the wife, he became entitled to a life interest in the wife's lands. The respective interests in each other's property given by the English Common Law to husband and wife are well summarized by the writer already alluded to (Schouler, *Husband and Wife*, p. 118), as follows: 'The husband yields to his wife no participation whatever in his own property, whether acquired before or during the continuance of the marriage relation, except a certain right of inheritance to his goods and chattels, of which he can generally deprive her by his will and testament, and also dower in his real estate, which is her only substantial privilege. In return for this, she parts with all control, for the time being, over her own property, whensoever and howsoever obtained, by gift, grant, purchase, devise, or inheritance; gives him outright her personal property in possession, and allows him to appropriate to himself those outstanding rights which are known as her *choses in action* [uncollected demands, etc.], or all the rest of her personal property; parts with the usufruct of her real estate, creating likewise a possible encumbrance upon it in the shape of tenancy by the courtesy; and finally takes, if she survives him, only her real estate, such of her personal property as remains undisposed of and unappropriated, with a few articles of wearing apparel and trinkets called *paraphernalia*. She cannot restrain his rights by will. She is not allowed to administer on his personal estate in preference to his own kindred, though the whole of it were once hers; while he can administer on her estate for his own benefit, and exclude her kindred altogether, even from participation in the assets. Thus unequal are the property rights of husband and wife by the strict rule of coverture. We speak not here of recent statutory benefits conferred upon the wife; nor of that relief which equity affords in permitting property to be held to the wife's separate use, and giving her a provision from her choses in action where the husband seeks its aid in appropriating them to his own use; but of what is to be properly termed the common law of husband and wife.' As a sort of compensation, however, for all this thraldom and injustice, the husband was liable for all the debts of the wife contracted before marriage, and for her support. He was also responsible in damage for frauds and wrongs committed by her during marriage. In respect to contracts the wife was incompetent to enter into them during marriage, unless her husband had abjured the realm or been banished, or where by local custom prevailing in certain parts of England, she could carry on a separate trade and contract in reference thereto. Even her earnings belonged to her husband, and the proceeds of their joint labor were also his property. Within recent years in England (1870, 1882), and in the United States, commencing about 1848, statutes known as married women's acts have been enacted which have revolutionized the Common Law idea of strict unity of husband and wife. The general scope of these statutes, which vary in the different states, is to recognize and protect the separate earnings and property of married women. The wife is under these statutes empowered to carry on a separate business or trade, for the debts of which she alone is liable. She may even constitute her husband her agent or clerk to carry on the business for her without, however, giving him or his creditors a right to interfere therewith. But such transactions must be free from fraud, and not mere covers to defraud the husband's creditors. In some states husband and wife may even form commercial co-partnerships together, or the wife can form such a co-partnership with a third person of the opposite sex. The legislation alluded to, has also removed the disability which existed under the English Common Law by which married women were precluded from making wills. Married women can now as a general rule in the United States, dispose by will of their separate property. Whether the radical changes introduced by the modern legislation above noticed are entirely beneficial to the marriage relation has been doubted. Thus, Prof. Parsons (1 *Contracts*, 340), an authority well qualified to speak, says, 'We know that in those states in which the greatest changes have been made, and still greater are desired by some persons, there are those who think mischief has already been caused, and that a brief experience will prove the inconvenience and danger of permitting husband and wife to possess interests and properties and powers, altogether, or in a great degree independent and equal. The tendency of this would seem to be, necessarily to make them bargainers with each other, and as watchful against each other and as careful for good security, as strict in making terms and compelling an exact performance of promises or conditions, and as prompt to seek in litigation a remedy for supposed wrongs, as seller and buyer, lender and borrower usually are; and as these parties may be, more properly and safely, than husband and wife.'

II. *Duties*—Except so far as the separate estate of the wife is concerned, the duties of the married pair and their corresponding rights have not been seriously affected by modern legislation. Making allowances for advancement in refinement and manners, due to the general progress of the age, the duties of husband and wife are substantially as they were under the English Common Law. The husband is the head of the family. While he is bound to furnish the wife with a home and support, it rests primarily with him to choose the home, and to determine what is a suitable support. The wife is bound to love, honor, and obey her husband. Each is entitled to the society and companionship of the other. The old English Common Law permitted the husband to moderately chastise and correct his wife. Corporal punishment is, however, no longer permitted either in this country or in England. From the husband's position as the recognized head of the family follows his right of 'gently restraining,' as it is termed, his wife from gross misconduct, of preventing her from visiting objectionable places, and from receiving unsuitable visitors in the household. The custody of children formerly belonged almost exclusively to the father. At the present day, however, while the father's rights in this respect are seldom interfered with, except in cases of misconduct, the interests of the children themselves are of paramount consideration. Their custody will depend upon the circumstances of the case, and will be denied to that parent who has proved himself or herself unworthy. The support which the husband is bound to give the wife includes food, clothing, shelter, and medical attendance, according to his means and position. He is also bound decently to bury his wife after death. So long as the husband provides the wife with a proper support and with a home, he is responsible for only such necessaries as he furnishes her, or which it may be presumed from the relation and circumstances of the parties he intended to furnish or ought to have furnished her. If he denies her a proper support, or by his immoral or cruel treatment drives her from his home, he will still be responsible for her support. What are necessaries, sufficient to charge the husband with liability to a tradesman furnishing them, depends not only on the husband's position and income, but also on the apparent position which he has permitted the wife to assume in the eyes of the world. As a general thing it may be stated that the husband is bound to support his wife, notwithstanding she owns a separate estate. Very extreme views have been taken by the courts as to what articles are necessaries, and no definite rule can be laid down except the general one above stated. In many states the wife's separate estate may become liable to tradesmen for necessaries furnished her irrespective of her husband's solvency or means.

III. *Disabilities.*—Under the English Common Law, neither husband nor wife could be witnesses for or against each other in civil suits in which either party was interested. Nor could either of them give any testimony in a civil or criminal case where such testimony might criminate the other. To the last rule there was a notable exception in the case where the wife charged the husband with an assault or other crime of greater degree upon her person. Otherwise the crime might have gone unpunished. These rules derived their force and were founded upon the sanctity of the marriage relation and the desire of the law to preserve the inviolability of that state. In strictness, however, these rigid rules produced much hardship, and they have been modified to suit the exigencies of the times. Thus in N. Y., it is provided with respect to civil trials that husbands and wives are not competent to testify against the other on allegations of adultery except to prove marriage. Neither can be compelled, or without the consent of the other, if living, allowed to disclose a confidential communication made by one to the other during marriage. In an action for criminal conversation, the plaintiff's wife is not a competent witness for the plaintiff, but she is a competent witness for the defendant as to any matter in controversy, except that she cannot without the plaintiff's consent disclose any confidential communication had, or made between herself and the plaintiff. And in respect to criminal trials, it is provided that the husbands, or wives of persons indicted or accused of crime are in all cases competent witnesses on the examination or trial of such persons, but that neither the husband nor the wife can be compelled to disclose confidential communications made by one to the other during their marriage.

IV. *Torts and Crimes.*—If torts (civil injuries) are committed by the wife in the husband's company, or by his order, the husband alone is liable for the damages resulting to third parties therefrom. If they are not so committed, husband and wife are jointly liable. Concerning the wife's liability for crime, Bishop (1 *Law of Married Women*, 23), speaking generally says: 'The central proposition is, that, while the wife has general capacity for crime, she shall still not be held responsible if she commits what would otherwise be a crime through constraint of her will by the husband; for then she is supposed not to have the necessary criminal intent. But in order for her to be excused on this ground, the husband must be present with her when she commits the act. If he is thus present, and the act is an ordinary misdemeanor, or a felony of the lighter kind, the presumption is, that it is done by his coercion, and the contrary must be proved in order to charge the wife. When we come to the higher felonies, as treason, murder (and some add robbery), there is no presumption of coercion by the husband, and for the wife to defend herself when charged with them on this ground, actual coercion must be shown. The same is true of those misdemeanors which are said to be "peculiar to the female sex," such as the keeping of brothels; in these cases, though the husband be present, the presumption is that the wife acted from her own volition.' In N. Y., however, and possibly in other jurisdictions, the legislatures have gone further, and declared that the mere presence of the husband shall in no case be a defense to the wife charged with the commission of a crime. See also GOODS IN COMMUNION: WILL: TERCE: also DIVORCE for the Scotch law.

HUSCH, *hôsh*, or Hushi, or Husi: town of Moldavia, on a feeder of the Pruth, 40 m. s.e. from Jassy. It is cap. of a district, has a cathedral, and is the seat of a bp. of the Greek Church. Here the treaty between the Russians and Turks was signed 1711. Pop. (1870) about 18,000.

HUSH, v. *hŭsh* [W. *hust*, a low buzzing noise (see Hiss)]: to still; to render silent. Hush'ing, imp. Hushed, pp. *hŭsht*. Hush-money, a bribe for silence. Hush! impera., silence; be still: Adj. still; quiet; silent. To hush up, to conceal or suppress; to avoid mention of.

HUSHING, n. *hŭsh'ing* [prob. a corruption of *flushing*]: term applied to one mode of exposing and collecting ore. In a ravine where surface ore is exposed or but lightly covered, a body of water is dammed and then allowed to flow through the ravine, tearing up the earth and stones and exposing new surfaces, from which the ore is gathered; a process of clearing water from the surface of ore, in stream works, by diverting and directing streams of water on it.

HUSK, n. *hŭsk* [Sw. *hylsa*, a pod: Low Ger. *hulse*, a husk: Dut. *hulsche*, covering of seeds: Dut. *huysken*, a case in which a thing is kept: comp. Gael. *seasg;* W. *hesg*, dry, barren]: the dry external covering of many fruits and seeds: V. to remove the husks from. Husk'ing, imp.: N. the act of stripping off husks. Husked, pp. *hŭskt*, covered with a husk; stripped of husks. Husk'y, a. -*ĭ*, abounding with or consisting of husks; dry; rough.

HUSKISSON, *hŭs'kĭs-on*, William: English statesman: 1770, Mar. 11—1830, Sep. 15; b. Birch Moreton, Worcestershire. He was sent to Paris 1783 to study medicine. He took part in the storming of the Bastile, and as a member of the Club of 1789, attracted attention by speeches on political economy. In 1792, he returned to England, received a subordinate appointment under the tory govt., and formed an intimate acquaintance with Pitt and Canning. In 1795 he was selected by Dundas, the war minister, to be first under-sec., and sat in parliament for Morpeth. He subsequently held several offices under Pitt, with whom he retired 1801, and on the dissolution of parliament 1802, lost his seat in the house of commons. In 1804, he was returned for Liskeard, and was appointed sec. of the treasury in the new Pitt cabinet. On Pitt's death 1806, he lost this office, but was restored to it by Mr. Percival 1807. He sat for Harwich, 1807–12; Chichester, 1812–23; and Liverpool, 1823–30. In 1814, he was chief commissioner of the woods and forests; 1822, pres. of the Board of Trade; 1827, sec. of state for the colonies; 1828, sec. of state for foreign affairs. But this office he resigned, and retired from the ministry the same year. Through his exertions the old restrictions on the trade of the colonies with foreign countries were removed. He also obtained the removal or reduction of many import duties, considerable relaxation of the navigation laws, and is allowed to have been the great pioneer of free trade. He received fatal injuries by being struck by an engine at the opening of the Liverpool and Manchester railway, and died the same evening. A collection of his speeches was published 1831, interesting from their comprehensiveness of views and fulness of accurate details.

HUSKY, a. *hŭsk'ĭ* [Dut. *hoest;* Icel. *hósti;* Ger. *husten*, a cough]: dry and rough in the throat, arising from cold or otherwise, producing muffled imperfect speech; hoarse. **HUSK'ILY**, ad. *-lĭ.* **HUSK'INESS**, n. roughness of sound; hoarseness.

HUSS, *hŭs*, **JOHN**: Bohemian reformer and martyr, whose name is associated with that of Jerome of Prague (q.v.), on account both of the work which they wrought, and of the death which they suffered: prob. 1369, July 6—1415, July 6; b. Hussinecz, near Prachaticz, in s. Bohemia. He studied at the Univ. of Prague, where he soon made great progress in the branches of learning most valued in that age, took his degree of master of arts 1396, and began to lecture publicly 1398. In 1402, he became preacher in the Bethlehem Chapel, Prague, and labored with the greatest earnestness for the instruction of the people, and in the discharge of all his clerical functions. As a preacher, he was greatly esteemed both by the common people and by the students; while as confessor to Queen Sophia, he obtained access to the court. At this time he became acquainted with the writings of Wickliffe, which exercised great influence over him. The monks and clergy became violent enemies to H., as he denounced, with continually increasing boldness, their corruptions. Abp. Sbinko publicly burned the writings of Wickliffe 1410, in compliance with a brief of Pope Alexander V., and complained to the pope of H. as a Wickliffite. Hereupon he was summoned to Rome; but he did not go, and the combined influence of the people, the court, and the university, compelled the abp. to remove a prohibition which he had issued against his preaching. But in 1412, Pope John XXIII. having published a bull of indulgence in order to a crusade against Ladislaus, the excommunicated king of Naples, whose kingdom the pope claimed as a papal fief, H. boldly raised his voice against the whole procedure as unchristian, while Jerome of Prague also stood forth to condemn, in the strongest manner, both the bull and the vendors of indulgences. An interdict against H., 1413, was the consequence. H., however, appealed from the pope to a general council and to Christ; and wrote a book *De Ecclesia* (*On the Church*), in which he condemned the abuses of the papacy, and denied the unconditional supremacy of the Roman pontiff. Thinking himself no longer safe in Prague, he now retired to his native place, where he preached the gospel with great power. In 1414, he went to Constance to the general council, summoned thither, indeed, on a charge of heresy, but under the protection of King Wenceslaus, and having a safe-conduct from Emperor Sigismund. Having reached Constance Nov. 3, he was on the 28th, apprehended in spite of the remonstrances of the Bohemian and Polish nobles. His trial was conducted with little regard even to the appearance of equity. 1415, July 6, thirty-nine charges were exhibited against him, some of which he acknowledged as exhibiting his doctrine, while others he utterly denied. Being required to recant his alleged errors—especially his assertion in *De Ecclesia*, that Christ, not Peter, is the Head of the Church—he refused to do so till they should be proved to be errors. He and his writings were now condemned to the fire, and in spite of his safe-conduct, the sentence was carried out on the same day, and the ashes of the martyr were thrown into the Rhine. See Palacky's *Gesch. von Böhmen*. H. was not distinguished for surpassing intellectual gifts, but he affords an instance of sublime moral strength. It has been said that he took from Wickliffe's hand the torch of reformation and passed it on to be taken and borne by Luther.

HUSSAR, n. *hûz-zâr'* [Magyar, *huszar*, a light horseman]: a light armed horse-soldier, adapted to harass the enemy: he is dressed in a loose jacket, with other articles of attire easy in set, and a fur cap; armed usually with a sabre and pistol. *Note.*—Said to be so named from *husz*, twenty, because a king of Hungary ordered in 1458 that the corps should be raised by selecting one man from every 20 in a village.

HUSSIF, n. *hŭs'sĭf* [AS. *hus*, a house: Icel. *húsi*, a case; *hús*, a house]: a case used by seamstresses to contain cotton, worsted, needles, and suchlike. *Note.*—The *f* in HUSSIF is excrescent; the word is not = *housewife*—see Skeat.

HUSSITE, n. *hŭs'sīt:* follower of John Huss (q.v.), Bohemian reformer. The followers of H., honoring him and Jerome of Prague as martyrs, despised the decrees and anathemas of the Council, and took terrible revenge on the priests and monks. The symbol of their confederacy was the cup, the use of which in the Lord's Supper they extended to the laity, as James de Misa had already done with the approbation of Huss. In 1417, King Wenceslaus was constrained to grant them the use of many churches. After his death, 1419, Aug. 13, the majority of the states refused to acknowledge his brother, Emperor Sigismund, who had broken his safe-conduct to Huss. The papal instructions to the cardinal legate, John Dominico, required him to take violent measures for the conversion of the Hussites. An insurrection ensued, and the war began, known in history as the Hussite War. Convents and churches were reduced to ashes, and priests and monks were slain. The Hussites divided into two parties—the *Calixtines* (q.v.), and the *Taborites* (q.v.). See *Huss et la Guerre des Hussites*, by Ernest Denis (1879).

HUSSY, or HUSSIE, n. *hŭz'ĭ* [contr. for *housewife:* AS., Icel. *hus*, a house, and Eng. *wife*]: applied to a female as a term of slight reproach.

HUSTED, *hū'stĕd*, JAMES WILLIAM: legislator: b. Bedford, N. Y., 1833, Oct. 31. He graduated at Yale College 1854, was admitted to the bar 1857, school-commissioner of Westchester co. 1858–60, deputy supt. of the state insurance dept. 1860–62, harbor-master of New York 1862–70, state commissioner of emigration 1870–72, maj.gen. of the state national guard since 1873, pres. of the N. Y. State Milit. Assoc. 1874, and elected speaker of the N. Y. assembly 1874, 76, 78, and 86.

HUSTINGS, n. plu. *hŭs'tingz* [AS. *husting*, the house or domestic court, a place of council—from AS. *hus*, a house; Icel. *thing*, Dan. *ting*, a court of justice]: the municipal court of the city of London; also the platform from which candidates for parliament, till the passing of the Ballot Act 1872, addressed the electors on the day of nomination.

HUSTLE, v. *hŭs'l* [Dut. *hutselen*, to shake to and fro: Norw. *huska*, to rock, to swing: comp. Gael. *tuisle*, to stumble, to fall: Dut. *hotsen*, to shake, to jolt]: to shake together in confusion; to push or crowd; to jostle in a crowd. HUSTLING, imp. *hŭs'lĭng*. HUSTLED, pp. *hŭs'ld.*

HUSUM, *hő'sûm:* town of Prussia, province of Schleswig-Holstein, on the coast of the North Sea. It was formerly strongly fortified, and possessed many ships. There are manufactures of leather and tobacco, and distilleries and breweries, and trade in wool and cattle. Pop. (1880) 6,267.

HUSWIFE, n. *hŭz'wĭf* [other spelling of *housewife* (see HUSSIF)]: a female manager of a house who is tidy and thrifty.

HUT, n. *hŭt* [F. *hutte*, a shed, a hut: W. *hotan;* O.Ger. *hot*, a cap: Dut. *hutte*, a cabin]: slight temporary erection; a mean dwelling: V. to place in huts. HUT'TING, imp. HUT'TED, pp.

HUT, *hŭt:* light construction, usually wooden, more or less rough in its details. It is often substituted for a tent for the housing of troops, when the sojourn in a camp or cantonment is likely to be of some continuance, as, for instance, through a winter. A hut, however rude, being wind and water-tight, is as superior in comfort to a tent as

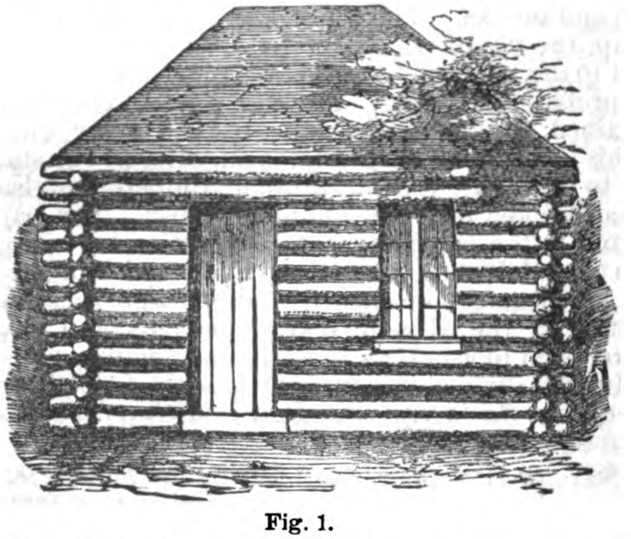
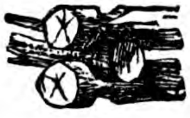


Fig. 1.

a tent is to the open air. Huts may be made of almost any size, and are sometimes for one officer; at others, for as many as 100 men.

The hut is as useful to the settler in a wild country as it is to a soldier. Huts are of various sorts: among these are the *log* hut, the *framed* hut, and the *pisé* hut (of tempered clay).

The *log hut* is formed of rough logs or trunks of trees, laid crosswise in tiers to the required height, as in fig. 1, the angles being formed, as in fig. 2, by a notch on each side of the log, about one-third of its diameter in depth, and a few inches from the extremity. The space between the logs is then made water-tight and air-tight by a stuffing of clay, wattles, sallows, or small bundles of twigs. Within, the joints should be lined with laths, or the whole interior may be boarded with inch-planks, if such are attainable. The roof should be supported by a scantling (see ROOF), and may consist of overlapping boards, or boards laid flush and shingled, or laths and shingles, or even birch-bark alone. The door is usually ledged, and there are one or two windows, with glazed sashes and shutters. These should be made by regular carpenters, and taken to the place of building ready for use. A hut thus formed makes a snug habitation, and will last many years; exclusive of the sashes, two men can erect, in about a week, a hut of rough logs sufficiently large for their residence—i.e., with interior area 15 ft. by 10 ft. When circumstances permit, the logs are occasionally squared, which enables them to be fitted more accurately to each other, and adds, of course, to the solidity and finish of the whole structure, as well as to its durability. In this case, the corner logs, instead of crossing each other, are joined by a dove-tail, or by cutting the end of each to an angle of 45°.


Fig, 2.

The *framed* hut has the advantage over the log hut of allowing more exactness of finish, and from its lightness and portability being easily transported to any place where logs for hut-building might not be forthcoming. It consists of a strong framework of squared wood, properly fitted together, and covered with overlapping planks or weather-boards. The side of a framed hut is shown in fig. 3. The pieces should be sawn to the proper size, fitted to each other, and numbered; then packed together in small compass for conveyance to the intended site, where the structure can soon be erected. No one piece need exceed 11 ft. in length, 6 inches in breadth, and 2 inches in thickness. The uprights should be not more than 15 to 18 inches apart, and should be firmly held by diagonal tie-rods, as in the illustration. The first step is carefully to level the ground on which the hut is to stand, and if a dwarf-wall of stone or brick, 8 or 10 inches high, can be built round, so much the better. On this ground or wall a rectangular frame of thick wood (say 6 inches by 3) must be laid as a basis for the framework; on this latter the uprights are placed, the binding tie-rods fixed, and the cap-sill, corresponding to the frame below, placed above all, every joint being carefully mortised and tenoned. The weather-boards can now be nailed on the outside, and when the roof is put on the hut is complete. The breadth should not, for stability, exceed 16 ft.; and when the hut is of considerable length, cross-beams should be thrown from side to side at the top. The roof should be made of ordinary scantling (see ROOF). It is usually estimated that one of these huts, 30 ft. long, 16 broad, and 10 high, makes a good barrack-room for 20 soldiers. When extra warmth is desired the spaces between the uprights are filled in roughly with bricks, burned or unburned.

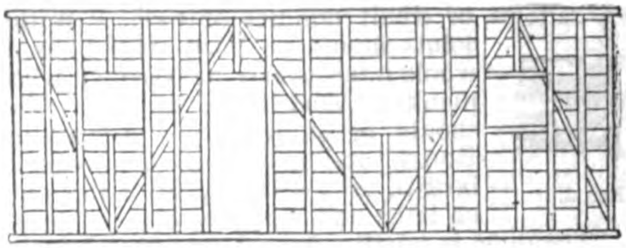


Fig. 3.—Side of a framed Hut.

Pisé huts, common in s. France, and useful where wood is scarce, as well as very comfortable, are walled with blocks of clayey earth, rammed with great pressure into wooden molds until they assume the forms of stones. These are laid one above each other much as stones would be by a mason, and the wall so formed is both durable and sightly, and the abode is comfortable.

The most critical operation for the non-professional hut-builder is roofing. This is usually of thatch, shingles, planks, paper, or felt, if lightness be an object; sometimes of stones, bricks, or tiles, if the walls be calculated to bear their pressure.

HUTCH, n. *hŭch* [F. *huche*, a chest or bin—from mid. L. *hutica:* Dut. *hok*, a cote for animals: Norw. *hokk*, a small apartment]: a chest or bin; a coop for rabbits; a basket or cage in which the miners bring the coals from the mines: V. to hoard or lay up, as in a chest. HUTCH'ING, imp. HUTCHED, pp. *hŭcht*.

HUTCHESON, *hŭch'ĕ-son*, FRANCIS: philosopher: 1694, Aug. 8—1746; b. n. Ireland; son of a Presb. minister. He studied for the ministry at the Univ. of Glasgow; but shortly after the completion of his theological course, he was induced to open a private academy in Dublin, which proved very successful. In 1720, he published *Inquiry into the Original of our Ideas of Beauty and Virtue*, etc., which introduced him to the notice of many influential personages, such as Lord Granville, then lord-lieut. of Ireland, Abp. King, Primate Boulter, and others. This work was followed, 1728, by *Essay on the Nature and Conduct of the Passions;* and the next year he was appointed prof. of moral philosophy in the Univ. of Glasgow. His largest and most important work, *A System of Moral Philosophy*, was published at Glasgow 1755 by his son, Francis Hutcheson, M.D., with a Preface on his Life, Writings, and Character. H. was a man of warm feelings and benevolent impulses. As a metaphysician, H. may be considered a pioneer of the so-called 'Scotch school.' From the period of his lectures, according to Dugald Stewart, may be dated the metaphysical philosophy of Scotland, and, indeed, the literary taste in general, which marked that country during the last century, though, as Stewart acknowledges and Hamilton shows, traces of the Scotch philosophy appear in earlier writers. But A. shines as a moral philosopher, rather than as a metaphysician. His system is largely that of Shaftesbury, but more complete, coherent, and clearly illustrated. H. is a strong opponent of the doctrine that benevolence has a selfish origin. The faculty by which moral distinctions are recognized, H. (after Shaftesbury) terms a *moral sense*. See ETHICS.

HUTCHINS, *hŭch'ĭnz*, THOMAS: 1730–1789, Apr. 28; b. Monmouth, N. J.: geographer. He entered the British milit. service 1745, became an officer in the 60th royal American regt., was asst. engineer in Gen. Henry Bouquet's expedition against the Shawnee Indians 1764, served in the Indian campaign in Fla., was imprisoned in London for sympathy with the American colonists 1779, and after release became geographer-gen. on the staff of Gen. Nathanael Greene in S. C. He prepared the maps and plates of Dr. William Smith's *Account of Bouquet's Expedition* (1765), and published *A Topographical Description of Virginia, Pennsylvania, Maryland, and North Carolina* (1778), *History, Narrative, and Topographical Description of Louisiana and West Florida* (1784), and several papers in the *Transactions* of Philadelphia scientific societies.

HUTCHINSON, *hŭch'ĭn-son:* city, cap. of Reno co., Kan.; on the Ark. river, and on the Ark. and the Atchison Topeka & Santa Fé railroads; 155 m. from s.w. of Topeka. It was founded 1871 by Clinton B. Hutchinson who built Ottawa, Kan., is central to a large and unusually rich agricultural region, and has the largest and purest deposit of rock salt in the country. The vein was struck at a depth of 400–475 ft., is 300 ft. thick, 99·87 per cent. pure, and covers an area of 10 m. each way. H. has a packing-house with a capacity of 3,000 hogs daily, and three other beef and hog packing establishments were completed 1889. Its retail trade extends to the 7 adjoining cos., and amounted (1886) to $2,500,000, and (1887) more than $6,000,000. New buildings to the value of $3,000,000 were erected 1887. The city contains 3 national banks (cap. $200,000), 5 state and private banks, large stock yards, 12 salt companies, waterworks, gas and electric light systems, street railroads, telegraph and telephone service, soda, soap, and sugar works, several flour mills, starch, oatmeal, canning and artificial ice factories, and carriage-works, its industries representing an aggregate capital of about $4,000,000. There are numerous churches, public schools, 4 bridges across the Ark. river, co. court-house, reformatory that cost

$1,000,000, and a daily newspaper. The climate is very healthful. Pop. (1888) 16,000.

HUTCHINSON, *hŭch'in-son*, **Anne**: religious enthusiast: 1591–1643; b. Lincolnshire, England. She emigrated 1636 to Boston, where she was a member in the First Church. At that time of high tension in religious discussion, she claimed to be a medium of divine revelations, and held meetings for women, in which she criticised the doctrines of Dr. Cotton's sermons, and held forth Antinomian opinions, afterwards strongly stigmatized by Cotton Mather. Great controversies arose, and a synod was called, in which her teachings were condemned, and she was banished from the colony. She and her friends obtained from the chief of the Narragansetts liberty to reside in Rhode Island, where they set up a community on the highly commendable principle, that no one was to be 'accounted a delinquent for doctrine.' After the death of her husband (who shared her opinions), she removed to a Dutch settlement, in the colony of New York, Westchester co., where she and her whole family of 15 persons were taken prisoners by the Indians, and all but one daughter murdered.

HUTCHINSON, *hŭch'in-son*, **John**: 1616–1664, Sep. 11; b. Nottinghamshire, England: Puritan and regicide. He was of good family and highly educated; married Lucy Apsley, daughter of the gov. of the Tower of London 1638; became lieut.col. in the parliamentary army 1642; gov. of the town and castle of Nottingham, which he defended against a royalist siege 1643; one of the judges who condemned Charles I.; member of parliament, and of the council of state. He opposed the later conduct of Cromwell, was pardoned at the restoration, and died in confinement under suspicion of treasonable intents. *Memoirs of Colonel Hutchinson* by his widow was published in London 1806.

HUTCH'INSON, **John**: 1674–1737, Aug. 28; b. Spennithorne, Yorkshire: English theological writer. He was steward of the household of the Duke of Somerset, and left his service to apply himself to religious studies, the duke procuring for him a sinecure appointment of £200 a year from government. In 1724, he published the first part of a work called *Moses' Principia*, in which he defended what he regarded as the Mosaic cosmogony, and assailed Newton's theory of gravitation. He published a succession of works till his death. His religions system is best exhibited in his *Thoughts concerning Religion*. The leading principle of it is, that the Holy Scriptures contain the elements not only of true religion, but of all rational philosophy, which, however, was to be derived only from the original Hebrew; and the Hebrew, for that purpose, was subjected to strange fanciful processes. His followers were called **Hutchinsonians**, and among them—strange as it may seem—were persons of considerable learning and celebrity.

HUTCH'INSON, THOMAS· 1711, Sep. 9—1780, June 3: b. Boston: royal gov. of Massachusetts. He graduated at Harvard College 1727, studied law; entered his father's counting-house; was a representative of Boston in the gen. court of Mass, 1737–49, and three times speaker; was appointed lieut.gov. 1756, chief justice of Mass. 1760, acting gov. 1769, and gov. 1771; and went to England 1774, where he received a crown pension and died. He was an active tory; in constant opposition to assembly and council; and resigned office after the privy council refused the petition of the gen. court of Mass. for his removal, based on letters from Benjamin Franklin which created the impression that H. had officially advised the enforcement of stringent measures by the English govt. against the American colonists.

HUTCHINSONIANS: see HUTCHINSON, JOHN (b. 1674).

HUTTEN, *hût'en*, ULRICH VON: 1488, Apr. 21—1523, Aug. 29: of an ancient and noble family: b. at the family castle of Steckelberg, in the electorate of Hesse. When he was ten years of age, he was placed in the monastery at Fulda; but disliking this mode of life, he fled to Erfurt 1504, where he associated with scholars and poets. He then lived at various places in n. Germany till about 1512, when he went to Pavia to study law. After several years in Italy, he returned to Germany, and made himself conspicuous by his publications, especially those concerning the affair of Reuchlin and the Dominican Hoogstraten, in Cologne, in which he came to the support of Reuchlin, and displayed no small learning and great power of satire. He again went to Italy 1515, to take the degree doctor of law, and returned to his native country 1517. He was crowned with the poet's laurel crown at Augsburg, and Emperor Maximilian conferred on him the honor of knighthood. In the same year he edited a work of Laurentius Valla, found in a convent, *De Falsâ Creditâ et Ementitâ Donatione Constantini Magni*, and 1518 accompanied Albert, Abp. of Mentz, to the diet of Augsburg, where Luther had his famous conference with Cajetan. Subsequently, he established a small printing-press of his own, and employed himself in writing and spreading pamphlets fully exposing the arrogance and wickedness of the clergy. Abp. Albert denounced him to Rome, whereupon he entered into an immediate and avowed connection with Luther, whom he had hitherto despised. At this time, also, he began to write in the German language, instead of Latin. Persecuted by his enemies, he availed himself of the protection of Franz von Sickingen, but was soon forced to flee. From this time H. was compelled to adopt a wandering life, and died in the Isle of Ufenau, in the Lake of Zürich. H. was bolder and more open in the expression of his opinions than almost any man of his age. He did much to prepare the way for the Reformation, and to promote it, though by keen satire rather than by moral and spiritual weapons. He was a man of brilliant genius, restless vanity, immoral life, and doleful end; yet he had qualities that drew the admiration and friendship of many distinguished and upright men, whose affection toward him was probably largely pity. He was reckless of consequences, and not careful in dealing with things that had become venerable in the eyes of many; but he was a man who feared nothing, even when almost all his friends trembled. He was a master of the Latin language. He left 45 different works, of which a collective edition was published at Berlin 1821–27, 6 vols. H. had a share in the *Epistolæ Obscurorum Virorum* (q.v.). See Life of H. by D. F. Strauss (1858), English trans. (1874).

HUTTON, *hŭt'on*, CHARLES: LL.D.: English mathematician: 1737, Aug. 14—1823, Jan. 27; b. Newcastle-upon-Tyne; son of a superintendent of mines. He became teacher in a school at Jesmond 1755, and afterward at Newcastle till 1773. During this period, he published *Treatise on Arithmetic and Book-keeping* (1764); *Treatise on Mensuration* (London, 1771); and *Principles of Bridges, and Mathematical Demonstration of the Laws of Arches* (Newcastle 1772). In 1773, he was appointed to the professorship of mathematics at the Royal Military Acad., Woolwich, and 1774, Nov., was elected a fellow of the Royal Society. Soon after this, he was selected to perform the calculations for determining the density of the earth from Dr. Maskelyne's observations on Schiehallion, and his report was published in *Philosophical Transactions*, 1778. In 1779, he received the degree LL.D. from the Univ. of Edinburgh. H.'s most important works are—*Tables of Products and Powers of Numbers* (London 1781); *Mathematical Tables* London 1785); *Mathematical and Philosophical Dictionary* (London 1795); *Course of Mathematics* (London 1798–1801); and *Recreations in Mathematics and Natural Philosophy* (4 vols. London 1803); the last a most interesting and instructive work. Besides these, he regularly contributed mathematical papers to the *Ladies' Diary*, of which he was for some time editor; also to the *Philosophical Transactions*. His biography has been written by Dr. Olinthus Gregory.

HUTTON, JAMES, M.D.: one of the founders of geological science: 1726, June 3—1797, Mar. 26; b. Edinburgh. He studied in his native city, and afterward at Leyden, where he took the degree M.D. He applied himself, however, not to the medical profession, but to agricultural pursuits and to the science of chemistry, from which he was led to mineralogy and geology. He contributed much to the improvement of agriculture in Britain. He made some chemical discoveries, and is the author of a Theory of the Earth and of a Theory of Rain. His Theory of Rain has been since acknowledged by men of sience as generally correct, though at first it met opposition. His Theory of the Earth—announcing the principle that geology is not cosmogony, but must deal with the materials of the earth—has for its distinguishing feature the supposed agency of a central heat, by which the elevation of strata and many other phenomena are accounted for; and some parts of the theory may be regarded as now substantially admitted by all geologists, though it was combated by the followers of Werner, who sought to explain everything by aqueous solution and crystallization. Dr. H. was indeed extreme in his theoretical views, and some of his followers were still more so. He was, however, not only a theorist, but an industrious observer also, and his discovery of granite veins is of importance in the history of geology. He had great versatility and vigor of mind.

HUXLEY, *hŭks'lĭ*, THOMAS HENRY, LL.D.: naturalist and comparative anatomist: b. 1825, at Ealing, Middlesex, England. He was educated at the school in that town, and afterward studied medicine in the medical school of Charing Cross Hospital. In 1846, he entered the medical service of the royal navy, and did duty at Haslar until the winter of the same year, when he was appointed assistant-surgeon on board the *Rattlesnake.* This vessel, commanded by Capt. Owen Stanley, was commissioned to survey the intricate passage within the Barrier Reef skirting the e. shores of Australia, and to explore the sea between the n. end of that reef and New Guinea and the Louisiade archipelago. Imbued with a passion for natural history, H. applied himself to the study of the numerous marine animals collected during the survey, and made them the subjects of scientific papers, which he sent home, diffident as to their value. They were published, however, by the Royal Soc. and the Linnæan Soc., and made their author known, while yet young, to the naturalists of Europe. Toward the end of 1850, the *Rattlesnake* returned to England, and H. had the gratification to find that his paper *On the Anatomy and Affinities of the Family of the Medusæ* had been published in *Philosophical Transactions*. Thus encouraged, he set to work to arrange his large accumulation of facts and observations, with a hope (which was disappointed) that the admiralty would contribute toward the cost of their publication. In 1851, papers on other branches of the same subject were printed in *Philosophical Transactions;* and in the same year H. was elected a fellow of the Royal Society. In 1852, one of the two Royal Medals annually given by the Soc. was awarded to him, in recognition of the scientific value of his papers, in which much light was thrown on the structure of a number of animals unknown, or little known, to British naturalists. In 1854, H. was appointed prof. of natural history in the Royal School of Mines, and, among his lectures in that institution, has delivered courses to working-men with beneficial results. In 1857, jointly with Dr. Tyndall, he wrote *Observations on Glaciers*, printed in *Philosophical Transactions;* and in the following year he delivered the Royal Society's Croonian lecture, *On the Theory of the Vertebrate Skull,* in which a highly important anatomical question was discussed. In 1859, his large work, *The Oceanic Hydrozoa; a Description of the Calycophoridæ and Physophoridæ* observed during his voyage, was published by the Ray Soc. with illustrative plates. He has since published papers on the Glyptodon, and the Osteology of that genus;

and in papers on the Mollusca, has shown that those animals have a common type or plan, similarly to the Annulosa and Vertebrata. H. contributed largely to the *English Cyclopædia;* and papers by him have appeared in the journals of the Royal, the Linnæan, the Geological, the Zoological, and other learned societies. *Man's Place in Nature* appeared 1863; *Lectures on Comparative Anatomy*, 1864; *Lessons in Elementary Physiology*, 1866; *An Introduction to the Classification of Animals*, 1869; *Lay Sermons*, etc., 1870; *Critiques and Addresses*, 1873; *American Addresses and Physiography*, 1877; a short work on *Hume*, 1879; and *Science and Culture*, 1881. Dr. H. was a member of the London school board till 1872. He is prof. of natural history in the Royal School of Mines, and Hunterian prof. of anatomy to the Royal College of Surgeons; and LL.D. of Edinburgh, Dublin, and Cambridge. He was inspector of fisheries 1881-85. As a keen and accurate observer of phenomena, Dr. H. has rendered service of a high order. As a strong advocate of the evolution hypothesis, he has not always held himself aloof from discussion pertaining to metaphysics rather than to physical science.

HUY, *hoy:* strongly fortified town of Belgium, the province of Liege, romantically situated amid lofty rocks on both banks of the Meuse, and in the immediate neighborhood of the finest scenery of that river, 17 m. s.w. of Liege. Its citadel, the works of which are partly excavated in the solid rock, commands the passage of the river. The church of Notre Dame, a graceful Gothic edifice, was begun 1311. In the vicinity are iron-works and coal mines, in the products of which the inhabitants carry on a lively trade by means of the Liege and Namur railway. The principal manufactures are paper, leather, zinc, beer, spirits, and an inferior wine. Peter the Hermit, on his return from the first Crusade, founded here the former abbey of Neufmoustier (*Novum Monasterium*), and was himself interred within it. H. has been frequently taken during the wars, of which this region has been the scene. It was captured last by Marlborough and Coehoorn 1703. Pop. abt. 12,000.

HUYGHENS, *hī'gėnz*, D. *hoy'chėnz* (VAN ZUYLICHEM), CHRISTIAAN: one of the great philosophers of the 17th c.: 1629, Apr. 14—1695, June 8; b. at the Hague; second son of Sir Constantine H. (1596–1687), who was a Dutch poet and diplomatist, and councilor to the princes of Orange. H. studied at Leyden and Breda. His first work, *Theoremata de Quadratura Hyperboles, Ellipsis, et Circuli, ex Dato Portionum Gravitatis Centro* (Leyden 1651), is an example of that powerful geometrical talent which lay at the foundation of all his scientific achievements. Soon after this, he constructed the pendulum-clock, following out the idea suggested by Galileo (see GALILEI). A complete description of H.'s instrument is in his great work, *Horologium Oscillatorium, sive de Motu Pendulorum* (Hague 1658). This work contains expositions of many of the cases of constrained motion, especially those applicable to the construction of time-keepers. H. has also developed and given precision to the investigations of Galileo on accelerated motion under the action of gravity; and there is no doubt, that to the clearness of his demonstrations, his great successor, Newton, in preparing his magnificent development of the principle of accelerating force, was largely indebted. Newton was a student and admirer of his works, and assigns to him, with Sir C. Wren and Wallis, the distinguished epithet of *hujus ætatis geometrarum facile principes.*

By means of an improved telescope of his own construction, H. discovered the ring of Saturn and the fourth satellite of that planet, 1655. In 1659, he published an account of these discoveries in *Systema Saturnium, sive de Causis Mirandorum Saturni Phenomenon, et Comite ejus Planetâ Novo.* In the end of this work is described an invention of great importance in astronomy—the Micrometer (q.v.), by which small angles between objects viewed by telescope are accurately measured. In 1660, H. visited England, where he was admitted a member of the Royal Society. He discovered the laws of collision of elastic bodies about the same time with Wallis and Wren, and also made a material improvement in the air-pump. In 1666, H. received an invitation to settle in France, with the promise of a pension from Colbert, then all-powerful in that country. He went to Paris, where he remained till 1681, having been admitted to the membership of the Royal Acad. of Sciences; but alarmed at the danger which seemed impending over the Protestants, he returned to his own country. After his return, he continued his favorite pursuits till his death at the Hague.

The optical works of H. claim attention. They are remarkable as maintaining a theory of light, which, opposed to the then more popular theory of Newton, is substantially the same with that now called the *undulatory theory.* By means of his theory, the product of his powerful scientific imagination, he explained the ordinary phenomena of reflection and refraction, and further succeeded in a satisfactory explanation of the phenomenon of double refraction, which Newton's theory failed to account for.

HUYSUM, *hoy'sŭm,* **JAN VAN:** 1682–1749, Feb. 8; b. Amsterdam: celebrated Dutch painter of flowers and fruits. He acquired the rudiments of his art from his father, a landscape painter. H. surpassed all his predecessors in mellowness, purity, and delicacy of coloring; the exquisite disposition of his lights and shadows; and above all, in his miraculous rendering of dew-drops and the motions of insects. He died at Amsterdam. H.'s masterpieces are in the galleries of Vienna, Munich, Dresden, and St. Petersburg.

HUZZA! int. *hŭz-zâ'* [Ger. *hussa,* huzza: Dan. *hurra,* hurrah]: a shout of joy or approbation. V. to receive with approbation. HUZZA'ING, imp. HUZZAED', pp. *-zâd'.*

HWANG-HO, *whâng-hō',* or HOANG-HO, *ho-âng-hō',* or YELLOW RIVER: one of the principal rivers of China, about

2,400 m. in length, the area of its basin being not less than 700,000 sq. m. It rises in a marshy plain between the Bayan-kara and Kwanlun Mountains, in a lake called Ala-nor, lat. 35° 30′ n. long., 96° e. Its course is crooked: after it leaves Ala-nor, it turns first s. 30 m., then e. 160., then w. 120, winding about the gorges of the Kwanlun, then n.e. into the province of Kansuh; next it proceeds n. 430 m., till it is bent e. by Inshan, on the edge of the table-land, where it incloses within its great bend the country of the Ortous Mongols. At the Peh-ling it is deflected s., and for 500 m. it divides the provinces of Shanse and Shense. At the s.w. corner of Shanse, it receives its largest tributary, the Wei-ho, 400 m. in length; from this point the Yellow river flowed until recently e. to the ocean, 650 m. distant, lat. 34°. It is little used for navigation, Chinese vessels being unable to stem its impetuous current. In some parts of its e. course, it is above the great plain through which it passes. The embankments requisite for averting inundations are a source of never-ending expense to the government, and their yielding to floods a frequent cause of desolation to extensive districts of country. This wayward and turbulent stream is said to have shifted its course nine times in 2,500 years; notably, 1851–53, when it turned off near Kaifung-foo in a n.e. direction, discharging its waters into the rivers of Chih-le, which disembogue in the Gulf of Pehchele, the mountainous province and promontory of Shantung intervening between its former and its present mouth, a distance by coast-line of about 500 m. More recently, it was announced that the old bed of the Yellow river, for more than 200 m. from its mouth, was a belt of sand, which, since 1853, has been, to use the Chinese term applied to it, 'as dry as dust.' The change seems to have been gradual. It has been suggested that earthquakes contributed to effect the phenomenon, another cause being neglect of the dikes by the imperial government. There is a bar with only five ft. of water across the new mouth of the H. Its present channel is probably the same as in ancient times; for it has shifted its bed at different periods of Chinese history. About 170 m. of the upper course of the H. were explored for the first time by Prejevalsky, 1880. The vast quantity of sediment conveyed to the sea by this river, giving it its color and name, is taken up in that part of its course which lies between the provinces of Shanse and Shense; above which its waters are remarkably clear. H. is held in great veneration by the Chinese.

HWEN T'SANG, or **Hiwen T'sang**: see **Hiouen Thsang**.

HYACINTH, n. *hī'ă-sĭnth* [F. *hyacinthe*—from L. *hyăcin'thus;* Gr. *hŭăkin'thos*]: in *anc. myth.*, a Spartan youth, beloved by Apollo, who was accidentally killed, and from whose blood the flower sprang; a beautiful flowering plant of many varieties; the blue iris, corn-flag, or gladiolus of the ancients; the genus of plants *Hyăcin'thŭs*, ord. *Lĭlĭācĕæ* (see below): a precious stone of a violet color; a variety of zircon: there are brilliantly colored varieties. The name is given also to fine red Cinnamon-stone (q.v.), or Pyrope (q.v.); and sometimes to ferruginous quartz of blood-red color, which from its abundance at Compostella, Spain, is called *H. of Compostella.* HY'ACIN'THINE, a. *-sĭn'thĭn,* consisting of or resembling hyacinth.

HYACINTH, *hi'a-sĭnth* (*Hyacinthus*), or JACINTH, *jā'-sĭnth:* genus of plants of nat. ord. *Liliaceæ:* bulbous-rooted plants with corolla-like, bell-shaped, 6-cleft perianth, six stamens fixed in the tube of the perianth, and dry capsular fruit.—The *Oriental H.* (*H. orientalis*), one of the most favorite of florists' flowers, is a native of Asia Minor, Syria, and Persia. It is now naturalized in some parts of s. Europe. The original was an insignificant flower, scarcely recognizable in the superb and brilliant varieties developed by careful culture. It has broad linear leaves, and a scape with a raceme of many flowers pointing in all directions. The flowers in cultivation exhibit great variety of color, chiefly blue, purple, and white. They are very beautiful and very fragrant: the fragrance is strongest about or after 11 o'clock at night. Among cultivated hyacinths, are many with double flowers. The H. has been cultivated from a remote period (before 1597), but about the beginning of the 18th c., double-flowered ones appeared, and the H. attained almost the first place as a florists' flower. At present the single-flowered sorts are again preferred. Great attention was bestowed on the production of new varieties, and enormous prices were given for bulbs of some of them. A price equal to $1,000 was sometimes paid for a single bulb. The principal seat of the cultivation of hyacinths was and still is at Haarlem. At present, however, the price is seldom more than $50 for the finest new variety of H., but though the trade is considered as now much depressed, the Haarlem gardeners still sell bulbs to the value of $10,000 to $15,000 yearly. H. bulbs, planted in pots, readily produce beautiful flowers; and flowers almost equally beautiful are obtained—for one year, however, only—by placing them in water in *H. glasses,* in which they form a favorite ornament of apartments in winter and early spring. The cultivation of the H. in the open ground is much more difficult. New varieties are raised from seed. Several other species of H. are natives of s. Europe, Africa, etc. The earliest variety is the white Roman H., small-flowered but sweet.—The GRAPE-HYACINTH and GLOBE-HYACINTH, frequently cultivated as garden flowers, are now referred to the genus *Muscari.*—A common British plant, growing in woods and copses, with beautiful blue flowers very like those of the Oriental H., but all drooping to one side (*H. non-scriptus,* also known as *Scilla nutans, Endymion nutans,* and *Agraphis nutans*), is sometimes called the WILD H., and sometimes the BLUE-BELL. The bulbs have been used for making starch.

HYACINTHE, *e-â-săngt',* FATHER (monastic name of CHARLES LOYSON): b. Orleans, France, 1827, Mar. 10. He studied at St. Sulpice, and after becoming a Rom. Cath. priest, taught philosophy and theology at Avignon and Nantes. Subsequently entering the order of the Carmelites, he became known as a powerful preacher, and gathered crowded and enthusiastic audiences of all ranks of society to the Madeleine and Notre Dame in Paris, 1865. Almost as remarkable as his eloquence was the boldness with which he denounced existing abuses in the church; and the Abp. Darboy defended him against the accusations of the Jesuits till in 1869 the general of his order imposed silence on him. H. replied by a letter in which he called for a thorough reform of the church, and was excommunicated. Relieved from monastic vows by the pope, he became a secular priest under the name of the Abbé Loyson. He protested vigorously against the Infallibility Dogma; but though he attended the 'Old Catholic' Congress at Munich, and on visits to the United States and England fraternized with Protestants, he always declared his intention to remain in the Catholic Church, trying to obtain reforms, such as the liberty of marriage for the clergy. On retiring from the pulpit of the Madeleine, 1869, he came to the United States, spending a few weeks with a Congl. pastor in northern Conn., and visiting friends elsewhere; and 1872, Sep. 2, he married in London, Mrs. Emily Jane Meriman, widow of an American gentleman. In 1873 he was chosen curé of a congregation of Liberal Catholics at Geneva, but soon left them, finding them to be 'neither liberal in politics nor Catholic in religion.' He has published a number of sermons and lectures, and has a congregation in Paris—the 'Gallican Church," of which he became rector 1881.

HYADES, n. plu. *hī'ă-dēz*, or HYADS, n. plu. *hī'ădz* [L. *hyădēs*—from Gr. *hŭădĕs*, the rainers—from *hŭō*, I rain]: a cluster of five (some say seven) stars in the Bull's face in the constellation *Taurus*, the rising of which with the sun was considered by the ancients to mark the beginning of the rainy season. In *myth.*, these were said to be daughters of Atlas, who had been translated to the sky.

HYÆNA: see HYENA.

HY'A-HY'A: see COW TREE.

HYALINE, a. *hī'ă-lĭn* [Gr. *hŭălŏs*, glass]: glassy; consisting of or resembling glass; in *bot.*, transparent or nearly colorless, applied to the part where the cell-nucleus appears; in *med.*, clear, and of a slight consistence like a jelly. HYALEA, genus of mollusks belonging to the class *Pteropoda* (q.v.), having shells of a beautiful transparent glassiness. HY'ALITE, n. *-līt* [Gr. *lithos*, a stone]: a variety of opal. HYAL'OGRAPH, n. *-ăl'o-grăf*, instrument for tracing a design on a transparent surface. HYALOG'RAPHY, n. *-lŏg'ra-fĭ*, art of writing or engraving on glass. HY'ALOID, a. *-loyd* [Gr. *eidos*, likeness]: like glass; transparent. HY'ALOSID'ERITE, n. *-sĭd'ėr-īt* [Gr. *sidērŏs*, iron]: a brown or yellow-colored very ferruginous and metallic-looking mineral—a variety of olivine.

HYALONEMA, n. *hī-a-lō-nē'ma* [prefix *hyalo-;* Gr. *nēma*, yarn]: in *zool.*, glass-rope; typical genus of *Hyalonemidæ*, family of siliceous sponges; in *paleon.*, the family occurs from the Silurian times till now.

HYBERNATE, HYBERNATION: see **HIBERNATE.**

HYBERNIA, n. *hī-bĕr'nĭ-a* [L. *hibernus, hybernus,* pertaining to winter]: typical genus of the *Hybernidæ,* a family of moths, group *Geometrina.*

HYBODUS, n. *hī'bō-dŭs* [Gr. *hubos,* curved, humped; *odous* or *odonta,* a tooth]: genus of fossil shark-like fish, whose teeth and osseous fin-rays are found in all the Secondary rocks from the Trias to the Chalk inclusive. The genus, with the small family of HYBODONTS to which it belongs, occupy a place between the Cestracionts, with their pavement of flat crushing teeth, and the sharks with their sharp-pointed cutting teeth. The teeth of the Hybodonts are conical, but broad and blunt; from the body of the tooth rises a large central cone, and several small lateral ones, decreasing in size as they recede from the principal cone. The enamel is strongly marked by longitudinal grooves and folds. The osseous rays of the dorsal fins are the only other preserved portions of these fossils. Like the Port Jackson shark, the H. had each of the two dorsal fins furnished with a large and strong spine, one-third of whose length was buried in the flesh. Nearly 50 species of this genus have been described.

HYBRID, n. *hī'brĭd* [F. *hybride*—from L. *hybrĭdă*, a mongrel, a hybrid—from Gr. *hubris*, a wanton act, an outrage]: a mongrel; a mule; an animal or plant, the produce of different kinds or species: ADJ. having the origin or character of a hybrid; applied to words formed of elements derived from different languages; heterogeneous or mixed. **HY'BRIDOUS**, a. *-ŭs*, produced from the mixture of two species. **HY'BRIDISM**, n. *-ĭzm*, or **HYBRID'ITY**, n. *-brĭd'ĭ-tĭ*, character, state, or condition of a hybrid. **HY'BRIDIZE**, v. *-īz*, to make or become hybrid. **HY'BRIDI'ZING**, imp. **HY'BRIDIZED**, pp. *-īzd*. **HY'BRIDIZA'TION**, n. *-ī-zā'shŭn*, the act of rendering hybrid; also **HY'BRIDI'ZING**, n. *-ī'zĭng*.

HY'BRID: term applied by naturalists to the offspring of different but generally nearly allied species of animals and plants; distinguished from the word *mongrel*, which is applied to the offspring of different varieties of the same species.

M. Broca, whose memoir on Hybridity of Animals is the most complete that has appeared, remarks that this condition may be (1) natural, (2) excited (*provoquée*), or (3) artificial. The first variety is such as occurs spontaneously among animals in their wild state; the second includes those cases in which domesticated animals, which would not naturally cross with one another, do so under the influence of man, and in opposition to their natural instincts; while the third variety is due to the artificial admixture of the male and female generative elements, and as far as is yet known occurs only in fishes, and in the vegetable kingdom. The second variety is by far the most common and the most important.

When the male of the species A can impregnate the female of the species B, it may happen that the process can be inverted, and that the male B can impregnate the female A. In other cases, while the male A can readily impregnate the female B, the male B cannot impregnate the female A. In the first case, the hybridity is termed *bilateral;* in the second, *unilateral*. The former is rare, and even when it does occur, the cross in one direction is more common and more productive than in the other. Thus, the ordinary mule, the offspring of the male ass and the mare, is much more readily obtained, and, physiologically, is less imperfect than the corresponding animal, the hinny, which occasionally results from the union of the stallion and female ass: see MULE: HINNY. Domestic sheep and goats afford an example of the latter (unilateral) kind of hybridity. The union of the he-goat and the ewe is frequently productive, while the union of the ram with the she-goat is always unproductive.

In the present state of our knowledge, it is impossible to predicate in what cases the crossing of different species will be productive, and in what cases it will be barren. While some closely allied species do not admit of a cross, other species, far more removed from one another, not only yield hybrids, but even fruitful hybrids. There is, however, a limit, beyond which the chance of offspring becomes reduced to zero, and, according to Broca: 'If the crossing of animals of different genera is now an incontestable fact, there is no authentic evidence that offspring has resulted from the crossing of animals of different orders.' Cases have been referred to, as showing that animals of different orders may cross, but none of them are established. The strongest apparent case of hybridity between different orders is that of the *Jumarts*, which were said to result from the union of the bull and the mare, or of the stallion and the cow. These jumarts were believed in from the time of Columella to that of Buffon, who fully investigated the subject, and found that they were merely hinnies—offspring of the stallion and the she-ass. Among mammals, hybrids have been obtained between the different species of the genus *Equus*. So far as experiments go, the horse, the ass, the zebra, the quagga, etc., breed freely *inter se*, but the degrees of fertility among their offspring have not been fully determined. The dog has been made to breed with the wolf and the fox, the lion with the tiger, the he-goat with the female sheep, the ram with the female roe-deer (*Cervus Capreolus*), and the hare with the rabbit. (See Prof. Owen's article, 'Hybrid,' in Brande's *Dictionary of Science, Literature, and Art.*) A case was recorded some time ago in *The Field* newspaper, in which a prolific union took place between a mastiff dog and a lioness that had been brought up together.

Among birds, hybridity is not uncommon. The swan will breed with the goose, the grouse with the blackcock, the pheasant with the common fowl, the goldfinch with the canary, etc. Among reptiles, hybrid offspring has been observed between the toad and the frog. Among fishes, hybrids have been obtained by artificial impregnation between different species of the genus *Cyprinus*.

Many hybrids have no propagative power, while in others it is so far limited as to admit only of reversion to the original specific form. When a hybrid possesses generative power, it breeds more readily with an individual of one of its parent stocks than with another hybrid like itself. The most remarkable example on record of generative power in hybrids is afforded by the experiments of M. Roux of Angoulême, who finds that he can cross hares and rabbits to any extent; and who has thus, by breeding *leporides*, established a new and lucrative department in agriculture. For a full account of these experiments, which are deserving of a trial in other countries, the reader may consult Brown-Sequard's *Journal de la Physiologie*, II., 374–383. These experiments have inflicted a severe blow on the popular doctrine of the permanence of species.

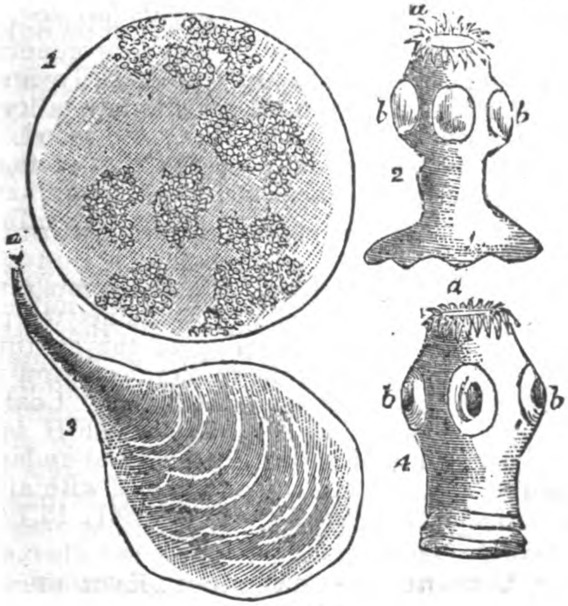
Experiments on the hybridization of plants have been very far from confirming the hybrid origin of forms apparently intermediate between other species, and which were once regarded as probably hybrids produced in a state of nature. The interference of man is usually necessary to effect an intermixture, and in many cases in which it has been found possible, it is by no means easy. The predilection for pollen of the same kind appears very strong; and if pollen, both of the same and of another kind, is applied to the stigma of a flower, the result is the same as if its own pollen had been there alone. The hybridizer, therefore, must cut away the stamens of the flower of which the pistil is to be impregnated, and carefully prevent all access of pollen other than that which he brings to it. Even with these precautions, it is found impossible to produce hybrids between some plants of the same family, and not very dissimilar.

Hybrid plants are said to partake generally of the characters of the male more than of the female parent. It is more certain that valuable results are often obtained as to size and abundance of fruit, brilliancy of flowers, hardiness, and other qualities. The question of the continued fertility of true hybrids is one having most important relations to the great questions concerning species. Some assert that neither among animals nor among plants are hybrids fertile for more than one or two generations, if kept by themselves; though they are readily fertile with either of the parent species, to which they become again assimilated. But this opinion is controverted, and the question must be decided by observation of facts, in judging of which, however, questions of no little difficulty must often arise as to what are and what are not different species.

The subject of the hybridization of plants was first investigated, and with great care and very numerous experiments, by Kölreuter, in the end of the 18th c., and has been more recently studied with much attention by Dean Herbert of Manchester, Van Mons, and particularly Gaertner.

HYDAS′PES: see JHELUM.

HYDATIDS, n. plu. *hī′dă-tĭdz*, or HYDATIDES, n. plu. *hī-dăt′ĭ-dēz* [Gr. *hūdătis* or *hudătĭda*, a vesicle—from *hudōr*, water]: term indefinitely applied to several distinct objects of a vesicular or cyst-like character, found in the bodies of men and certain mammals. True H. were formerly regarded as cystic Entozoa (see ENTOZOON), such as Cysticercus, Cœnurus, and Echinococcus; but all these forms are now discovered to be larval stages of Tænia or Tape-worm (q.v.). These H. may occur in almost any part of the body, and they have been observed in man, the ape, the ox, the sheep, the horse, the camel, the pig, the kangaroo, and some other vegetable feeders, though not in carnivorous animals or in the rodents. They are generally inclosed in an external sac attached to the tissue of the organ in which it is situated, and which is frequently common to many H., each of which has a distinct envelope. The fluid in the interior of the hydatid itself is almost always colorless and limpid, but the fluid in the common cyst in which the H. float is often of a yellow color. The *Cœnurus cerebralis* is found in the brain of various ruminants, and gives rise to the disease in sheep known as 'the staggers.' When the hydatid occurs in the fourth ventricle, the animal, instead of turning round and round in one direction, springs in the air, and this variety of the affection is hence distinguished by German veterinarians as *das Springen.* Whenever any of the above forms of H. are swallowed by man or the lower animals, they may proceed, under favorable circumstances, to be developed into the higher stages of tape-worm. Two species of Echinococcus are usually noticed, namely, the *E. hominis,* occasionally found in the brain and abdomen of man, and the *E. veterinorum,* of common occurrence in various parts of the body of the pig, and several other mammals, but it is not certain that they are really distinct. These Echinococci do not become developed into tape-worms unless they reach the intestinal canal of some animal, by being taken as food; and in ordinary cases of H., consisting of Echinococci, the cysts and their contents undergo a kind of degeneration, becoming in some cases converted into fatty or calcareous matter, while in other cases the contents become granular, the peculiar hooklets (see TAPE-WORM) which occur in them, and which remain unaltered for a long time, revealing their true origin. The so-called acephalocyst, or common globular hydatid, which sometimes attains the size of a child's head, is probably a degenerated or abnormally developed echinococcus.—H. sometimes occasion so little inconvenience, that persons, in whom they are discovered after death, have not suspected any disease in the organ in which they are found. On other occasions, they grow rapidly, and cause so much irritation that suppuration is excited in or around the common sac, which may either burst externally, or into a mucous canal or a serous cavity. In



Hydatids:
Copied from Rymer Jones's *Animal Kingdom.*
1, Cœnurus Cerebralis, natural size; 2, one head magnified; *a*, oval circlet of hooks; *b*. suckers; 3, Cysticercus Tenuicollis, natural size; 4, head magnified; *a*, circlet of hooks; *b*, suckers.

the first or second case, the H. will be discharged, and recovery may take place; in the third case, fatal inflammation will ensue. Little can be done for the treatment of this affection, except that occasionally, if the cyst is near the surface, it may be carefully punctured. For means of prevention, see TAPE-WORM.

False H. are simply serous cysts, occurring either alone or in clusters, whose mode of origin is not understood. Structures of this kind, on a small scale, are common in the choroid plexus of the brain; while on a large scale they are found containing the fluid in ovarian dropsy. These false H. are of comparatively common occurrence in the uterus also, which they may distend to such a size as to simulate pregnancy.

HYDATINA, n. *hī-da-tī'na* [Gr. *hudatis*, a watery vesicle]: in *zool.*, typical genus of the *Hydatinæa*, a family of *Rotatoria*, established by Ehrenberg.

HYDATOID, a. *hī'da-toyd* [Gr. *hudōr*, water; *eidos*, appearance, likeness]: resembling water in quality, nature, appearance, or consistency; in *anat.*, the membrane surrounding the aqueous humor of the eye or that humor itself.

HYDE, *hīd:* important manufacturing town of Cheshire, England, seven m. e s e. of Manchester, and about the same distance s.e. of Oldham. Until a comparatively recent period, it was a mere village; but since the extension of the cotton-trade at the beginning of this century, it has rapidly increased. Besides the numerous cotton-factories, iron, water, and print works are carried on. Coal abounds in the neighborhood. The district in which H is situated is densely peopled, and is furnished with abundant means of communication, by railway and canal, with all the important towns in the vicinity. Pop. (1861) 13,722; (1871) 14,223; (1881) 28,629.

HYDE, EDWARD: see CLARENDON, EARL OF.

HYDE PARK: tp. in Cook co., Ill.; comprising S. Chicago, the new city of Pullman, and more than 40 villages, towns, and hamlets, suburban to Chicago; area 49 sq. m. The different settlements are under village organization, contain 25 churches, 25 schools of various grades, 13 post offices, electric light, gas, water, and sewage works, numerous, large, and varied manufactories, places of amusement, public libraries and reading rooms, daily and weekly newspapers, and steam and street railroad connections with each other and with Chicago. H. P. village is 7 m. from Chicago. Pop. tp. (1870) 3,644; (1880) 15,716.

HYDE PARK: village in H. P. tp., Norfolk co., Mass.; on the Neponset river and the New York and New England railroad; 8 m. s.w. of Boston. It contains several churches, graded schools, public library, savings bank, weekly newspaper, manufactories of cotton, curled hair, machinery, paper and woolen goods. and many residences of Boston business men. Pop. tp. (1870) 4,136; (1880) 7,088; (1885) 8,400.

HYDE PARK: noble enclosure of nearly 400 acres, extending from the w. extremity of London to Kensington Gardens; named from having been the manor of the hyde belonging to the Abbey of Westminster. It became the property of the crown on the dissolution of the monasteries, in the reign of Henry VIII. A canal, or sheet of water, called the Serpentine, though in the form of a parallelogram, was made in H. P. 1730–33, by order of Queen Caroline. At the e. end of it is an artificial waterfall; constructed 1817. On the s. side are the barracks of the Lifeguards. It was in H. P. that the great International Exhibition of 1851 was held, in a Crystal Palace erected specially for the occasion. It is not recorded at what time the public began to have free admission to Hyde Park. But Ben Jonson speaks of the show of coaches which it presented in his time; and we know that it was constantly resorted to on the morning of May-day for the sports comprehended under the term Maying. Till the middle of the 17th c., there was a part of it which contained deer. About that time, it began to be a place for races and military reviews. It was resorted to also for duels. After the Restoration, it appears to have become the favorite promenade, which it has since continued to be. It has undergone many changes of boundary and division; a large part of Kensington Gardens has been taken from it, also an angle at the s.e. corner on which Apsley House now stands.

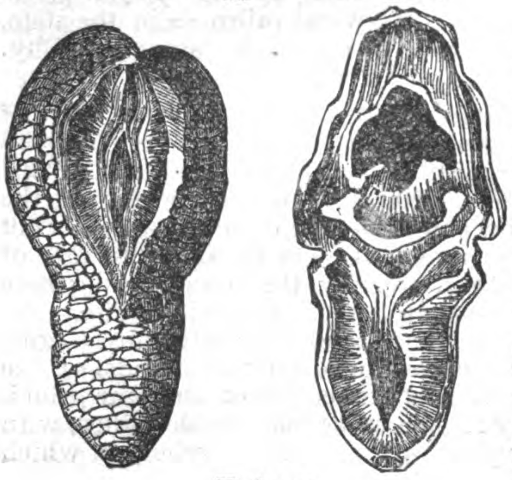
HYDERABAD, *hī-dėr-a-bâd'*: state in s. India, including Berar; lat. 15° 10′—21° 41′ n., long. 74° 40′—81° 31′ e.; about 475 m. long and wide; area of Berar, 17,728 sq. m.; of the Nizam's territories, 80,000 sq. m.; whole state about 98,000 sq. m.; bounded n. and n.e. by the Central Provinces, s. and s.e. by territory subject to the Madras Presidency, and w. by territory subject to the Bombay Presidency: pop. est. 9,000,000. In general the soil is fertile, yielding valuable crops of rice, wheat, maize, oil-seeds, fruits and garden produce, cotton, indigo, sugar-cane, and tobacco. Silk, lac, gums, oils, raw and tanned hides, the famous Deccan-bred horses, and metal ware, are largely exported, and salt, grain, timber, and European piece-goods imported. There are several railroads in the state, and the three principal ones pass through the cap., H. City. The Nizam is the principal Mohammedan ruler in India.

HYDERABAD, *hī-dėr-a-bâd'* (*Haidarábád*): city, cap. of the Nizam's dominions (q.v.) or Haiderabad state, in central s. India; on the right bank of the Musi, lat. 17° 22′ n., and long. 78° 30′ e., 1,800 ft. above sea level. At the first census (1881) the pop. was found to be 354,692 (not 200,000, as had been supposed). On the opposite side of the river is the British Residency, the stream being here bridged by nine spacious arches of squared granite. Besides these erections and the palace of the native sovereigns, is the principal mosque, fashioned after the model of the Kaaba at Mecca; while at the meeting of the four principal streets of the city rises another remarkable edifice, with four minarets resting on four connected arches, on which run the four converging thoroughfares. The neighborhood abounds with huge tanks, one 3 m. long, 2 wide, and another said to be much larger: see SECUNDERABAD. For the Assigned Districts of H., see BERAR.

HYDERABAD′ (Haidarabad): chief city of Sinde, India, and cap. of a dist., four m. e. of the left bank of the Indus. Pop. (1881) 48,153. The place is famous for manufacture of silks, gold-work, pottery, and arms of various kinds, such as matchlocks, swords, spears, and shields. As against a native force, it is strong, occupying a somewhat steep height, and having a rampart flanked by round towers.

The *district* of Hyderabad in Sinde, is a vast alluvial plain, 216 m. long, 48 m. broad, e. of the river Indus; 9,053 sq. m. Pop. abt. 725,000, of which 560,000 Mohammedans, 120,000 Hindus, 45,000 of other creeds and tribes.

HYDER ALI, *hī′dėr â′lē,* or HAIDAR ‘ALI: abt. 1702-1782, Dec.: one of the greatest Mohammedan princes of India. His father, who was a gen. of the Rajah of Mysore, afterward obtained Bangalore in fief, and both these honors descended to his son. H. A., 1759, dispossessed his master, allowing him, however, to retain his title, while he himself took that of *daïva* or regent. He then conquered Calicut, Bednor, Onor, Cananor, and other neighboring states; and in 1766, his dominions included more than 84,000 sq. m. He waged two wars against the British, in the first of which he was completely successful, and dictated terms of peace under the walls of Madras; but died suddenly at Chittore before the termination of the second, in which he was aided by the French. He also joined in a native confederacy for the expulsion of the British from India. He, besides, withheld the customary tribute from the Mahrattas (q.v.), and waged successful war against them. In his wars he showed great resolution and perseverance. H. A. was remarkable among Asiatic princes for the mildness of his character and government, and was much beloved by his people. He promoted agriculture, commerce, and the arts, and protected all religions, requiring only submission to his laws. His son and successor was Tippoo Sahib (q.v.).



Hydnora.

HYDNORA, *hĭd-nōr′a:* genus of plants of nat. ord. *Rhizanthaceæ*. *H. Africana* is a native of s. Africa, where it is called *Jackal's Kost*. It is a parasite chiefly on the roots of large succulent spurges, and is a plant of most extraordinary appearance and structure, resembling a fungus rather than a phanerogamous plant. Its flowers and fruit are entirely concealed in its interior. It has a smell like that of a fungus, or of decaying roast-beef. The s. African savages roast and eat it.

HYDNUM, *hĭd′nŭm:* genus of fungi (*Hymenomycetes*), having the under side of the *pileus* covered with soft spines which bear the spores. The species are numerous. *H. repandum* is common in parts of Europe, and much used as an esculent in France, Italy, and Germany. It grows on the ground, chiefly in pine and oak woods, either solitary, or in clusters or rings.

Hydnum.

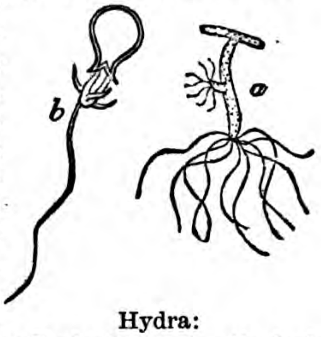
HYDR, *hī′dr*, and HYDRO, *hī′drō* [Gr. *hūdōr*, water]: a common prefix, in scientific terms, denoting the presence, action, or quality of water; also, in certain chemical terms, denoting the presence of *hydrogen*.

HYDRA, *hē′drâ* (sometimes Sidra or Idra or Nidero): island of Greece, off the e. shore of the Peloponnesus (now the Morea), about 5 m. from the coast of the dept. of Argolis and Corinth. It is about 13 m. long, 3 m. broad; 38 sq. m. The shores are rocky and steep, and the interior, rising to about 1,800 ft., is destitute of vegetation and of water. On the n.w. coast is the town and seaport of Hydra, the white, flat-roofed houses of which, ascending from the harbor, climb the side of a hill. The streets, owing to the irregularity of the site, are steep and uneven, but remarkably clean. This town, the only one in the island, is one of the most beautiful in Greece. The people are employed chiefly in cotton and silk weaving, in tanning, and in commerce.

The island of H. was uninhabited in ancient times. The nucleus of the town was formed by a few fishermen and peasants, who, suffering from the oppressions of the Turks, crossed over from the neighboring mainland, and were followed by crowds from Albania, Argolis, and Attica, in the 15th and 16th c. In the Grecian war of independence, the Hydriotes took a most active part; and none were more liberal in contributions to the patriotic cause. In 1825, the pop. was estimated at 40,000, and about that time the islanders were considered the richest in the archipelago. They possessed exclusively the carrying trade of the Black Sea and the Mediterranean, and traded to England, the Baltic, and even to the United States. Since the revolution, however, more accessible ports have risen to be the centres of Greek commerce, and H. has considerably declined. Pop. (1871) 11,684.

HYDRA, n. *hī′dră* [L. *hydra;* Gr. *hūdră*, the hydra, a water-snake—from Gr. *hūdōr*, water]: a water-snake. In *anc. myth.* the H. was a fabulous serpent-monster, said to have inhabited the marshes of Lernæa, in Argolis, not far from the sea-coast. Accounts vary as to its origin and appearance. Some make it the issue of Styx and the Titan Pallas; others, of Echidna and Typhon. It is represented as having many heads, which immediately grew up again as often as they were cut off, and, according to some, doubling in number. The original number generally ranged from seven to nine, though Simonides gives it 50, and certain historians a hundred, and even more. Its mouths, as numerous as its heads, discharged a subtle and deadly venom. The destruction of this reptile was one of the 12 labors of Hercules (q.v.). **HYDRA-HEADED**: having as many heads as the hydra, for when one head was struck off two at once sprang up in its place; denoting a difficulty or misfortune which apparently increases and strengthens the longer it is grappled with.

HY'DRA, or **FRESH-WATER POLYP**: type of the class **HYDROZOA**, which, with the **ANTHOZOA**, form the subkingdom *Cœlenterata*. See **POLYPI**: **ZOOPHYTE**. The H. has a gelatinous, sub-cylindrical body, which, from its contractility, undergoes various alterations of form. One end expands into a disk or foot, which adheres to a leaf, twigs, etc.; while at the opposite end is a mouth, surrounded by a circlet of tentacles, five to twelve or more in number. These tentacles are exceedingly contractile, at one moment thrown out as long delicate threads, at the next, drawn up into minute wart-like knobs. Numerous thread-cells project from their surface, the larger ones possessing a sheath and three recurved darts or barbs, and terminating in a long and extremely slender filament. The mouth leads into a capacious cavity throughout the whole length of the animal, which, exclusive of its tentacles, seldom exceeds three-fourths of an inch. On minutely examining the H., or any member of the class Hydrozoa, the body is found to be composed of two membranes, an ectoderm and an endoderm, the former constituting the outer layer of the animal, and having one side always in contact with the water, while the other side is in close contact with the endoderm, whose free surface forms the lining of the great internal cavity. The food of the H. consists of such minute living organisms as come within the reach of its tentacles, and by these apparently fragile threads, which the animal projects like a lasso, crustaceans, worms, etc., are seized, which would be deemed at first sight superior to their captor in strength and activity. The tentacles appear, however, to possess, through the action of the thread-cells, a powerful benumbing or paralyzing influence, for it has been observed that soft-bodied animals which have succeeded in escaping from the grasp of the H. frequently die very soon. The prey, when mastered, often still alive, is thrust into the internal cavity, where the nu-



Hydra:
a, **Hydra Vulgaris, attached to a piece of stick—a young polyp is sprouting from the side of the parent animal; *b*, one of the larger thread-cells, with its three recurved barbs.**

tritive parts are absorbed by the H., while the indigestible portions are expelled through the mouth.

Although the H. is found usually adhering by its circular foot or disk to submerged leaves, twigs, etc., it is not permanently fixed. It often moves on surfaces under water somewhat after the manner of a leech, both ends taking a part in the movement, and occasionally the disk is protruded above the water, and thus acts as a float.

Sometimes, especially in the autumn, true reproductive organs may be observed, both male and female organs usually on the same animal. Propagation by gemmation is, however, the most common mode of increase. Minute tubercles appear on the body of the parent animal, which, as they increase in size, gradually resemble it; becoming perforated at their free extremity, and tentacles gradually being formed. The pedicle by which they originate by degrees becomes thinner, and finally gives way, leaving the young H. perfectly independent. One of the most remarkable points in the history of this animal is its power of being multiplied by mechanical division. If a H. be cut into two, or even more pieces, every one will, in time, assume the form and functions of the original animal.

Several species of H., such as *H. viridis*, *H. vulgaris*, *H. fusca*, etc., have been described, which differ in size, color, etc. When living hydræ are removed from the water they appear like minute specks of jelly, which quickly recover their true form on being restored to their proper element. The great authority on these singular animals is Trembley, *Mémoires pour servir à l'histoire d'un Genre de Polypes d'eau douce* (1744).

HYDRACHNA, n. *hī-drăk'na* [prefix *hydr-;* Gr. *achnē*, anything shaved off; froth, chaff]: typical genus of the family *Hydrachnidæ*, water-mites, a family of Acarina. They swim by means of the fringes on their legs.

HYDRACID, n. *hī'drăs'ĭd* [Gr. *hudōr*, water; Eng. *acid*]: hydrogen acid, acid containing hydrogen with another element, but without oxygen; e.g., hydrochloric acid: the name was given to acids in which the acidifying principle was supposed to be hydrogen: see ACIDS. The division of acids into *oxyacids* and *hydracids* belongs rather to a past than to the present state of chemistry.

HYDRAFORM, a. *hī'dră-fawrm* [L. *hydra*, a water-snake; *forma*, shape]: resembling the common fresh-water polyp in form.

HYDRAGOGUE, n. *hī'dră'gŏg* [Gr. *hudōr*, water; *agō*, I lead]: active purgative producing a great flux from the intestinal membrane, consequently occasioning very watery stools. Hydragogues are of great use in some varieties of dropsy, being the most effectual means of diminishing the liquid poured into the cellular tissue and serous cavities of the body. Jalap (especially when combined with bitartrate of potash) and elaterium, a medicine which, from its extreme power, must be given only under professional advice in very small doses (one eighth to one-third of a grain), and with great caution, are perhaps the best examples of this class of purgatives.

HYDRANGEA, n. *hī-drān'jē-a* [Gr. *hudōr*, water; *anggei'on*, a vessel, a capsule]: genus of plants of nat. ord. *Hydrangeaceæ*, or *Hydrangeæ*, which many botanists make a sub-order of *Saxifrageæ:* distinguished by having 4–6 petals, 8-12 or many stamens, a more or less inferior ovary, and 2–5 styles. *Hydrangeaceæ* are shrubs with opposite, or sometimes whorled leaves, destitute of stipules. In the genus H. the flowers are in cymes, the exterior flowers sterile and dilated. More than 30 species are known, chiefly natives of the s. parts of N. America, and of China and Japan. The species popularly known as the HYDRANGEA (*H. hortensia*), is a native of China and Japan, and has long been in cultivation there as an ornamental plant. It was introduced into Britain by Sir Joseph Banks 1788, and speedily became popular, being readily propagated by layers and cuttings, as a favorite greenhouse plant, and frequent in cottage windows. In s. England it endures the open air. It seems almost impossible to water it too freely; a large plant has been known to receive with advantage 100 gallons of water daily; and in favorable circumstances it becomes a magnificent shrub. A plant in Devonshire, England, has had 1,000 large cymes of flowers expanded at once. The flowers, generally pink, are sometimes blue; the blue color is owing to peculiarities of soil. Peat and iron ore are said to be productive of the blue flowers.—*H. Japonica*, introduced into Europe from Japan by Siebold, is remarkable for its very large cymes of flowers.—*H. nivea* and *H. quercifolia*, American species, are frequent in flower-gardens in N. America. The finest American species is *H. paniculata grandiflora*, hardy, 8 or 10 ft. high, and very attractive in the shrubbery in late summer and early autumn. HYDRAN'GEA THUNBERGII, *thŭn-bėr'jĭ-ī* [after *Thunberg*, a celebrated traveller and botanist]: a species whose leaves furnish a tea of a very high character, bearing the name Ama-tsja in Japan.

HYDRANT, n. *hī'drănt* [Gr. *hudōr*, water]: a pipe or spout for discharging water at a fire; a water-plug.

HYDRANTH, n. *hī'drănth* [Gr. *hudra*, a water-serpent; *anthos*, a flower]: the polypite or proper nutritive zooid of the Hydrozoa.

HYDRARGILLITE, n. *hī-drâr'jĭl-īt* [Gr. *hudōr*, water; *argil'los*, clay]: a name given to the native phosphate of alumina, under the erroneous idea that it consisted of alumina and water.

HYDRARGYRUM, n. *hī-drâr'jĭ-rŭm* [Gr. *hudrar'gŭrŏs*, fluid silver—from *hudōr*, water; *argŭrŏs*, silver]: quicksilver or mercury. HYDRARGYRIA, n. *hī'drâr-jĭr'ĭ-ă*, one of the ill effects of mercury applied locally. HYDRARGYRIASIS, n. *hī-drâr'jĭ-rī'ă-sĭs,* a disease produced by the abuse of mercury.

HYDRASTIS, *hī-drăs'tĭs*, or WARNERIA, *wawr-nēr'ĭ-a:* genus of plants of nat. ord. *Ranunculaceæ*, allied to *Anem-*

one, but having flowers destitute of petals, and succulent or *baccate* fruit, collected into a head. The only known species, *H. Canadensis*, a perennial herbaceous plant, with tuberous roots, and head of fruit resembling a raspberry, is common in watery places in Canada, and among the Alleghanies, as far s. as Carolina. Its root is used for dyeing yellow, also in medicine as a tonic. YELLOW ROOT and ORANGE ROOT are its American names.

HYDRATE, n. *hī'drāt* [Gr. *hudōr*, water]: compound containing a definite proportion of water chemically combined with a definite quantity of some other constituent. Although water is a perfectly indifferent substance, possessing neither acid nor basic properties, yet it enters into combination both with acids and with bases, and thus forms the bodies termed hydrates. Thus, when an acid has once been allowed to combine with water, the entire separation of the water can usually be effected only by the presence of some strong base, which displaces the water. If, e.g., diluted sulphuric acid be distilled, water is expelled up to a certain point, when both acid radical and water are distilled together. The liquid now contains one equivalent of water and one of acid radical ($H_2O.SO_3$), and is termed sulphuric acid, and this equivalent of water can be displaced only by an equivalent of potash, or some other base. H. of baryta ($BaO.H_2O$), H. of lime, or slacked lime ($CaO.H_2O$), H. of sesquioxide of iron ($Fe_2O_3.3H_2O$), and H. of oxide of copper ($CuO.H_2O$), are similar cases, except that here the water is displaced by an acid instead of a base. The above are examples of hydrates of acids and bases or oxides. Gypsum ($CaO.SO_3.2H_2O$) is an example of a hydrate of a salt. HY'DRATED, a. *-drā-tĕd*, formed into a hydrate. HYDRA'TION, n. *-shŭn*, the act or state of becoming a hydrate.

HYDRAULIC, a. *hī-drawl'ĭk* [L. *hydraul'ĭcŭs*—from Gr. *hudōr*, water; *aulos*, a pipe: F. *hydraulique*]: relating to the conveyance of water through pipes; worked by water; also HYDRAUL'ICAL, a. *-ĭ-kăl*. HYDRAUL'ICS, n. plu. *-ĭks*, the science which treats of the application of the forces influencing the motions of fluids; the art of raising, conducting, and employing water for practical purposes: see HYDRODYNAMICS: HYDROSTATICS. HYDRAULIC CEMENTS, cements which have the property of becoming hard under water (see CEMENT): also HYDRAULIC LIMES (see CEMENT). HYDRAULIC FORGING, forging of metal by pressure instead of by hammering: it is done with the hydraulic press (q.v.), and the process resembles that of rolling.

HYDRAUL′IC CRANE: crane worked by water-pressure, recently brought into extensive use. Wherever a large number of cranes have to be worked near each other, water-pressure is by far the most manageable, economical, and convenient mode of working them.

Fig. 1 represents one of the simplest forms of hydraulic cranes, for loading goods in a railway station. It is entirely of iron, and consists of two upright cheeks, A, between which there is fixed a hydraulic ram (similar to that in the hydraulic press), occupying the lower half of the upright frame A. The upper end of this ram carries a pulley B. A similar pulley is fixed to the upright frame at C. A chain is secured to a bracket, D, on the upright frame. This chain passes up over the pulley B, down and under the pulley C, and then over the pulley E, on the end of the jib of the crane. It is obvious that the rising and falling of the ram will cause the chain, F, to ascend and descend with its load G.

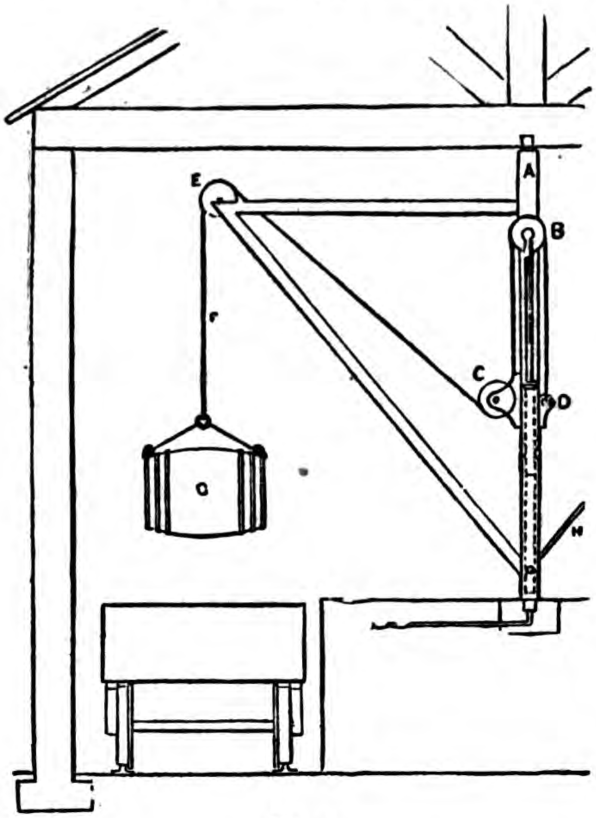


Fig. 1.

The ram is forced to ascend by the admission of water under great pressure by the handle H, which serves also to allow the water to flow out after it has done its work, and the ram descends by its own weight, allowing the chain, F, to run down with or without a load on it.

The pressure usually employed in working hydraulic cranes is greatly in excess of the pressure admissible in the case of steam. Six or seven hundred pounds to the sq. inch is the usual working-pressure. This great pressure is produced by an arrangement called an accumulator, which consists of a large hydraulic ram of 16 or 18 inches in diameter, A, fig. 2, carrying a wrought-iron cylinder, B. This cylinder is filled with stones or gravel to the weight of 60 or 70 tons. A powerful horizontal steam-engine forces water into the cylinder C, and slowly raises the ram, A, with its enormous load. Pipes lead away from the cylinder to the cranes in the different parts of the station, and are thus supplied with water under the great pressure caused by the load B, fig. 2, forcing the ram A, fig. 2, into the cylinder. The load B, fig. 2, is constantly rising and falling a little as the cranes draw their supplies from the cylinder C, fig. 2. If the cranes were supplied direct from the force-pumps of the steam-engine, without the intervention of this accumulator, their action would be jerky and unsteady. The accumulator acts as a reservoir of power, and when it happens that a great number of cranes are drawing off water at the same moment, and in excess of what the engine force-pumps can supply, the ram descends, keeping up the while the full 700 lbs. pressure; and then, when the cranes are demanding less abundant supplies, the engine overtakes its work, and sends the ram up again. When it arrives at the top, it touches a lever communicating with the throttle-valve of the engine, and thus slows or stops the engine when the accumulator has mounted to its maximum height. The moment it begins to descend, the lever is relieved, the throttle-valve opens, and the engine goes on again with such speed as the work demands.

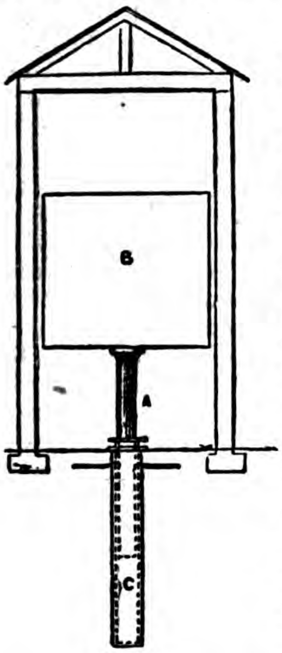


Fig. 2.

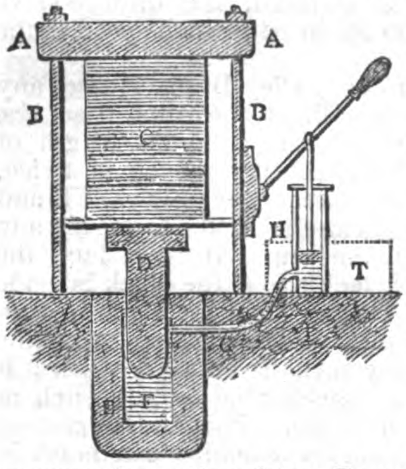
It is easily seen that when the pulley B, fig. 1, rises any given distance, the weight G will, at the same time, rise *double* that distance, because B raises a double length of chain; and, in the same way, by passing the chain twice, thrice, or any greater number of times over pulleys at B and C, fig. 1, the weight G, fig. 1, can be made to travel any number of times further than the ram. It is, in fact, the reverse action of a block and tackle. If the block is made to move, the *fall* will move further than the block in proportion to the number of times the rope passes over the sheaves. This kind of arrangement is adopted when it is desired to lift anything to a considerable height, such as grain to upper floors of a warehouse. There is, of course, a diminution in the weight that the machine can hoist, in proportion to the excess of travel of the load to that of the ram.

The hydraulic lifts, elevators, or ascending rooms, now in use in many high buildings, are constructed on the same plan as the accumulator, fig. 2. A cylinder, C, is sunk 60 or 70 ft. into the ground, thus admitting a ram, A, of nearly equal length to rise out of it, on a sufficient pressure of water being forced into it by a steam-engine. The elevator takes the place of the loaded cylinder B. Balance weights are attached to the elevator, to steady its movements, and to guard against any failure in the mechanism. A rope passing from bottom to top of the channel, through which the lift or elevator rises, affords to the person in the elevator the means of regulating its movements.

HYDRAUL'IC EN'GINES: engines worked by water-pressure, sometimes used where water under high pressure is obtainable. Their structure does not differ in any essential particular from that of a steam engine, except that as the pressure under which they work is five to ten times greater than that of a steam-engine, they are much smaller. For one form of hydraulic engine see Water-power. Another common form is that of three small cylinders in which three plungers work. The water is admitted into the cylinders by means of valves, and forces the plungers outward. These plungers are connected with a three-throw crank; and when they have completed their outward travel, or working stroke, the water is allowed to escape from the cylinder; the plunger then slides inward, to be again forced outward by a fresh rush of water admitted at the proper instant into the cylinder by the action of the valve.

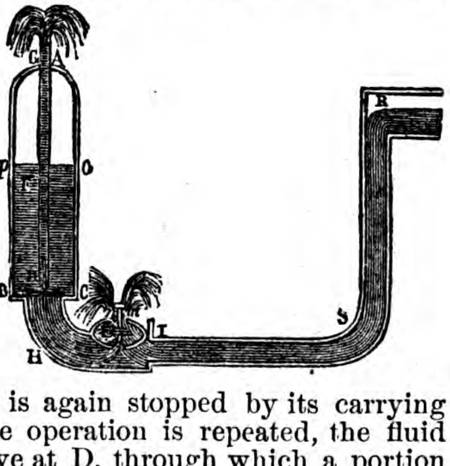
HYDRAUL'IC JACK: form of hydraulic press (q.v.) applied instead of a jack-screw for raising heavy weights. An immense power may be developed for lifting houses, ships, etc.

HYDRAUL'IC PRESS, called also Bramah's Press, from its inventor: machine for producing and applying great pressure by water-power. It depends on the principle, that a pressure exerted on any part of the surface of a liquid is transmitted undiminished to all parts of the mass, and in all directions: see Hydrostatics. The annexed figure represents the essential parts of the machine, the details of construction being omitted. F is the cavity of a strong metal cylinder E, into which the piston, D, passes water-tight through the top. A tube, G, leads from the cylinder to a force-pump H; and by means of this, water is driven from the tank T into the cavity F, so as to force the piston, D, upward. The piston supports a table on which are placed the bales, books, or other arti-



cles to be pressed; and the rising of the table presses them against the entablature AA, which is fastened to the pillars BB. The power of the press is readily calculated. Suppose that the pump has only one-thousandth of the area of D, and that, by means of its lever-handle, the piston of the pump is pressed down with a force of 500 pounds, the piston of the barrel will rise with a force of one thousand times 500 pounds, or more than 200 tons. The rise, however, will be slow in proportion to the power. The enormous multiplying power given by this machine has been applied to a great variety of useful purposes, such as compressing bales of cotton, paper, etc., expressing oils, bending (and 'forging') iron plates and bars, and raising weights. It was employed for launching the *Great Eastern* at Millwall, and for raising to their position the tubes of the Britannia Bridge.

HYDRAUL'IC RAM; a simple and conveniently applied mechanism, by which the momentum or weight of falling water can be made available for raising a portion of itself to a considerable height. In the annexed figure, which represents a section of Montgolfier's hydraulic ram, R is the reservoir from which the water falls, RS the height of the fall, and ST the horizontal tube which conductsthe water to the engine ABHTC. E and D are two valves, the former of which closes its cavity by ascending, the latter by descending; and FG is a pipe reaching within a very little of the bottom CB. The valves are such that the water at its normal pressure cannot support their weight; the valve E is prevented from falling below a certain point by a knob above *mn*. When the water is allowed to descend from the reservoir, after filling the tube BHS, it rushes out at the aperture *mn*, till its velocity in descending RST becomes so great as to force up the valve E, and close the means of escape.. The water being thus suddenly checked, and unable to find a passage at *mn*, will produce a great action on every part of the containing vessels, and by its momentum raise the valve D. A portion of water being admitted into the vessel ABC, the impulse of the column of fluid is expended, the valves D and E fall; the opening at D being thus closed, and that at *mn* opened. The water now rushes out at *mn* as before, till its motion is again stopped by its carrying up the valve E, when the operation is repeated, the fluid impulse opening the valve at D, through which a portion of the water passes into ABC. The valves at E and D thus alternately closing and opening, and water at every opening of D making its way into ABC, the air therein is condensed, for it has no communication with the atmos-



phere after the water is higher than the bottom of the pipe FG. This condensed air, then, exercises great force on the surface, *op*, of the water, and raises it in the tube, FG, to a height proportioned to the elasticity of the imprisoned air. The principles of the hydraulic ram are capable of very extensive application. In well-constructed rams, the mechanical effect obtained has been found to be about ⅔ of the energy in the falling water. For raising comparatively small quantities of water, such as are necessary for the supply of single houses. farm-yards, etc.—where water at the lower level is plentiful and cheap—the hydraulic ram is a most useful piece of mechanism. Its details have been greatly improved since the time of Montgolfier.

HYDRENCEPHALOCELE, n. *hī'drĕn-sĕf'ă-lō-sēl* [Gr. *hudōr*, water; *engkĕph'ălon*, the brain; *kēlē*, a tumor]: a serous tumor occasioned by a hernial protrusion of brain through a fissure in the cranium. HY'DRENCEPH'ALOID, a. *-sĕf'ă-loyd* [Gr. *eidos*, likeness]: resembling hydrocephalus or dropsy of the brain. HY'DRENTER'OCELE, n. *-tĕr'ō-sēl* [Gr. *entĕră*, the bowels; *kēlē*, a tumor]: dropsy of the scrotum complicated with intestinal hernia.

HYDRIDÆ, *hī'drĭ-dē*: family of water-snakes, now called HYDROPHIDÆ (q.v.).

HYDRIDE, n. *hī'drīd* [Gr. *hudōr*, water]: chemical compound of hydrogen with another element: the term is applied both to combinations of hydrogen with metals, and to similar combinations with organic or compound radicals. Hydrogen forms hydrides with at least four metals—arsenic, antimony, copper, and potassium. The first two of these hydrides are the well-known gases, arseniuretted hydrogen (AsH_3) and antimoniuretted hydrogen (SbH_3). The hydride of methyl or marsh-gas ($C_2H_3.H$), and the hydride of ethyl ($C_2H_5.H$), are examples of the second variety of hydrides. HYDRIC, a. *-drĭk*, containing hydrogen.

HYDRIODATE, n. *hī-drī'ō-dāt* [Eng. *hydrogen*, and *iodine*]: a salt formed by the union of hydriodic acid with a base. HY'DRIOD'IC, a. *-ŏd'ĭk*, denoting an acid produced by combining hydrogen and iodine.

HYDRO: see HYDR.

HYDROBORACITE, n. *hī'drō-bŏr'ă-sīt* [Gr. *hudōr*, water; Eng. *boracite*]: a mineral, a gypseous-like compound, having a radiated-fibrous and foliated structure, and generally freckled with spots of iron oxide.

HYDROBROMIC ACID, *hī'drō-brō'mĭk* [*hydro*, and *bromic*, which see]: a gas, composed of hydrogen and bromine, powerfully acid, and resembling hydrochloric acid.

HYDROCARBONS, n. plu. *hī'drō-kâr'bŏns* [Gr. *hudōr*, water; Eng. *carbon*]: term usually applied to the bitumens, mineral resins, and mineral fats, which are composed of hydrogen and carbon in varying proportions: see CARBOHYDROGENS. HYDROCAR'BURET, n. *-bū-rĕt*, a compound of hydrogen and carbon.

HYDROCAULUS, n. *hī'drō-kawl'ŭs* [Gr. *hudra*, a water-serpent; *kaulos*, a stem]: in *zool.*, the main stem of the cœnosarc of a hydrozoon.

HYDROCELE, n. *hī'drō-sēl* [Gr. *hudōr*, water; *kēlē*, a tumor]: medical term for a dropsy of the tunica vaginalis, a serous membrane or sac investing the testis. H. (popularly, dropsy of the testicle) occurs as a smooth, pear-shaped swelling, fluctuating when pressed, devoid of pain or tenderness, though sometimes causing slight uneasiness from its weight.

The quantity of serous fluid in the sac is usually 6 to 20 ounces, but it occasionally exceeds 100 ounces. H. may occur as a result of acute inflammation, but it usually comes without apparent local cause. It is most frequent about or beyond middle life, and generally in persons of feeble power, or with a tendency to gout; sometimes, however, it occurs in young children, either in the same form as in adults, or as what is termed *congenital hydrocele*, when the communication between the tunica vaginalis and the abdominal peritoneum is not obliterated, as it normally should be.

The treatment is divided into the *palliative* and the *curative*. By the former, the surgeon relieves the present annoyance of his patient, while by the latter he aims at the permanent removal of the disease. The palliative treatment consists in the use of suspensory bandages, evaporating and discutient lotions, and tapping with a fine trochar. Tapping seldom gives more than temporary relief, the swelling usually again regaining its former bulk in three or four months.

The curative treatment consists in setting up sufficient inflammation in the tunica vaginalis to destroy its undue secreting faculty. This is most commonly done by the injection of tincture of iodine into the sac, or by the passage of a fine seton or an iron wire (as proposed by Dr. Simpson) through it.

HYDROCEPHALUS, n. *hī'drō-sĕf'ă-lŭs* [Gr. *hudōr* water; *kĕphălē*, the head]: dropsy of the head, generally known as water in the head. **HY'DROCEPHAL'IC** a. *-sē-făl'ĭk*, relating to or connected with hydrocephalus.—*Hydrocephalus* includes three distinct diseases—acute H. chronic H. and spurious H. or, as Dr. Marshall Hall termed it, hydrocephaloid disease.

Acute H. is inflammation of the brain as it usually occurs in scrofulous children. The name is not a good one, as it refers merely to a frequent effect of the disease, and not to its cause or essence; and for the reason further, that a similar effect may result from other morbid conditions: it is, however, so universally adopted, that it would be inexpedient to change it. The disease is so dangerous that it is of great importance to detect it in its earliest stage, and even to look out for indications of its approach. The premonitory symptoms (which, however, do not occur in all cases) consist chiefly in a morbid state of the nutritive functions. The appetite is capricious, the tongue foul, the breath offensive, the belly enlarged, and sometimes tender, and the evacuations unnatural; and the child is heavy, languid, and dejected, and becomes either fretful and irritable, or drowsy and listless. Restless sleep, attended by grinding of the teeth or moaning, a frequent sudden scream, clenching of the fists, and a turning in of the thumb toward the palm of the hand, are also important premonitory signs. After these symptoms have lasted some days, severe pain in the head comes on; it is generally of a sharp or shooting character, recurring at intervals, often during sleep, and causing the child to shriek. Coma or morbid drowsiness supervenes, and the shrieking is replaced by moaning. Vomiting is a frequent concomitant. In this first stage of H. which commonly lasts two or three days, the pulse is rapid, and the symptoms generally are those of excitement. In the second stage, the pulse becomes irregular, variable, and often slow. General heaviness and stupor come on. The light, which annoyed the child in the first stage, is no longer a source of annoyance; the pupils become dilated, the power of sight becomes imperfect or lost, and squinting is almost always observed. The little patient now lies on its back in a drowsy condition; and at this period spasmodic twitchings, convulsions, or paralysis may come on. The excretions are passed unconsciously. This second stage may last a week or two, and is often attended by deceptive appearances of amendment, the child frequently regaining the use of its senses for a day or two, but then relapsing into a deeper stupor than before. The symptoms in the third or last stage, which may last only a few hours, or may extend to a fortnight, are very similar to those in the second, except that the pulse again becomes very rapid, beating sometimes so quickly that it can scarcely be counted, and gradually gets more and more weak, till the patient expires. The characteristic appearances after death are softening of the central part of the brain, with the effusion of serous fluid, usually to the extent of several ounces, into the ventricles; and a tubercular deposit, in the shape of small granules. upon or between the membranes of the brain. The only disorder with which acute H. can easily be confounded is infantile remittent fever. It is essentially a disease of childhood: it scarcely ever occurs after the 12th year. Half the cases that occur are in children between three and six years of age. As the treatment should be left entirely to the physician, it is unnecessary to notice it further than to state that strong antiphlogistic remedies—such as cold to the head, leeching, and active purging—applied in the first stage of the disease, yield the most satisfactory results; yet under this treatment, three cases out of four are lost.

Chronic H. is a perfectly distinct disease from acute H.: the acute is an inflammation, the chronic is a dropsy. In chronic H. a watery fluid collects within the skull, before the bones have united to form the solid brain-case, and by pressure outward causes the bones to separate, and increases the size of the head sometimes to an enormous extent. Thus Dr. David Monro relates the case of a girl six years old whose head measured two ft. four inches in circumference. While the skull is rapidly enlarging, the bones of the face grow no faster than usual, and the great disproportion of size between the head and the face is at once diagnostic of the disease. This disorder sometimes commences before birth, and almost always in early childhood, before the fontanelles and sutures of the skull have closed. In some rare cases, it has occurred later, as, for example, at seven or nine years old, and the closed sutures have opened under the augmenting pressure. When the sutures will not yield, death from pressure on the brain speedily ensues. Most children with chronic H. either recover or die in infancy; but a few survive, bearing their disease to adult life, or even to old age. Blindness, deafness, palsy, and idiocy—one or more—are commonly associated with this disease, but occasionally the intellect and senses are sufficient for the ordinary requirements of social life. The treatment may be attempted by internal remedies or by surgical appliances. The medical treatment most worthy of trial consists in the administration of diuretics, purgatives, and especially mercury, which may be given in the form of calomel in minute doses, and applied as ointment externally. The surgical expedients are bandaging and puncturing the head. The former has in some cases effected a permanent cure; the latter has in many cases certainly prolonged life, though the disease has finally conquered. Neither of these means is applicable after the bones of the skull have united. This disease occasionally occurs in adult or in advanced life, after enlargement of the head has become impossible. Stupor, paralysis, and an inability or unwillingness to speak, are in these cases the most prominent symptoms. Dean Swift's death was due to this disease, and it is recorded that during the last three years of his life he remained in a state of silence, with few and slight exceptions.

Spurious H.—the *hydrocephaloid disease* of Dr. Marshall

Hall—resembles acute H. in many of its symptoms, and has often been mistaken for it. Instead, however, of being an inflammatory disease, it is a disease of debility, and is due to a deficient supply of blood to the brain. The following are, according to Watson, the distinctive characters of it: the pale, cool cheek; the half-shut, regardless eye; the insensible pupil; the interrupted, sighing respiration; and the state of the unclosed fontanelle. If the symptoms are those of acute H. the surface of the fontanelle will be convex and prominent; while if they are due to spurious H. and originate in emptiness and want of support the fontanelle will be concave and depressed. The remedies in this disease, which readily yields to treatment, are nourishing diet, small doses of wine or even of brandy in arrow-root, decoction of bark, ammonia, etc.

HYDROCHARID'EÆ, or HYDROCHARIDACEÆ: see ANACHARIS: VALLISNERIA.

HYDROCHLORATE, n. *hī'drō-klō'rāt* [Eng. *hydrogen*, and *chlorine*]: a compound of hydrochloric acid with a base. HY'DROCHLO'RIC, a. *-klō'rĭk*, consisting of hydrogen and chlorine.

HYDROCHLO'RIC AC'ID (symbol, HCl; equivalent 36·5): one of the most important compounds in inorganic chemistry. If the two gases which enter into its composition (hydrogen and chlorine) be mixed in equal volumes, they will remain without action upon each other, if kept in the dark; but as soon as they are brought into direct sunlight, they unite with a loud explosion, and hydrochloric acid gas is the result. The principal characters of this gas are, that it is colorless, intensely acid, irrespirable, and even when largely diluted, is very irritating to the lungs and eyes, and very injurious to vegetation; that it is heavier than air (its specific gravity being 1·2474, air being taken at 1·000); that it can be condensed into a colorless liquid; that it is very soluble in water, and that it is neither combustible nor a supporter of combustion. When allowed to escape into the air, it produces white fumes, by condensing the atmospheric moisture. If the air be previously dried, no such fumes are apparent.

The solutions of this gas in water form the acid known first as *Spirit of Salt*, then as *Muriatic Acid*, and now termed *Hydrochloric* or *Chlorhydric Acid*. A saturated watery solution of this gas at 40° has a specific gravity of 1·21, and consists of 1 equivalent of the gas dissolved in 3 equivalents of water. It forms a colorless, fuming liquid, which acts as a caustic. On heating it, the gas is evolved abundantly until the temperature slightly exceeds 212°, when there distils over a diluted solution, having a specific gravity of 1·1, and consisting of 1 equivalent of the gas, and 8 equivalents of water. It is to these solutions of hydrochloric acid that the term *hydrochloric acid* is far more commonly applied than to the gas itself. They possess the ordinary characters of an energetic acid, and neutralize the strongest bases. The neutralization is, however, not in consequence of the acid combining with the oxide, but is due to the simultaneous decomposition of the acid and of the oxide, water and a metallic chloride being formed. If M represents a monad metal, the reaction is expressed by the equation $M_2O + 2HCl = 2MCl + H_2O$. All metals which, at a red heat, decompose water, decompose this acid also, and cause an evolution of hydrogen, the reaction being expressed as follows in the case of a monad metal: $M + HCl = MCl + H$.

H. A. gas is a common gaseous volcanic product. Free H. A., in a very dilute form, is also a constituent of the gastric juice of man and animals, and acts an essential part in the digestive process.

Commercial *muriatic acid*—to use the name employed by manufacturing chemists—is made by heating, in iron cylinders, common salt (chloride of sodium) and oil of vitriol (sulphuric acid), and condensing the evolved gas in water contained in a series of stoneware Wolffian Bottles (q.v.), the reaction being explained by the equation:

$$\overset{\substack{\text{Chloride}\\ \text{of Sodium.}}}{2NaCl} + \overset{\text{Oil of Vitriol.}}{H_2SO_4} = \overset{\substack{\text{Hydrochloric}\\ \text{Acid.}}}{2HCl} + \overset{\text{Sulphate of Soda.}}{Na_2SO_4}.$$

This commercial acid may contain various impurities—e.g. iron (which gives it a bright deep yellow color), the chlorides of sodium and arsenic—the latter being derived from the oil of vitriol—sulphuric and sulphurous acids, chlorine, etc.; from which it can be purified to a great extent by dilution and redistillation. 'If pure,' says Prof. Miller, 'the acid should leave no residue when evaporated; on saturating it with ammonia, it should give no precipitate of oxide of iron; sulphuretted hydrogen should produce no turbidity in it, which would be the case if arsenic, free chlorine, or sulphurous acid were present; and on dilution with three or four times its bulk of water, no white cloud of sulphate of baryta should be produced by the addition of chloride of barium.'

The presence of H. A., or of the soluble chlorides in solution, may be detected by the addition of a few drops of a solution of nitrate of silver, which occasions the formation of a white curdy percipitate of chloride of silver, which is insoluble in nitric acid, but dissolves in a solution of ammonia.

Liquid H. A. (under the name of spirit of salt) was known to the alchemists. H. A. gas was discovered by Priestley 1772; and Davy 1810 ascertained that it was composed of chlorine and hydrogen.

In many of their properties, the analogous acids, hydrobromic, hydrofluoric, and hydriodic acids resemble hydrochloric acid.

HYDROCOTYLE, *hī-dro-kŏt'ĭ-lē:* genus of umbelliferous plants, having simple umbels, entire acute petals, and fruit of two flat orbicular carpels, with five more or less distinct thread-like ribs, and no vittæ. The species are numerous, generally more or less aquatic, widely distributed. One, *H. vulgaris*, which grows in marshy places, is called in Britain MARSH PENNYWORT from the orbicular leaves; and sometimes White-rot, Sheepsbane, Flowkwort, etc., from a notion that it is injurious to sheep which eat it, causing foot-rot or fluke-worm—effects to be ascribed rather to the marshy situations in which it grows.

Marsh Pennywort, or White-rot (*Hydrocotyle vulgaris*).

HYDROCYANATE, n. *hī′drō-sī′ă-nāt* [Eng. *hydrogen*, and *cyanogen*]: a compound of hydrocyanic acid with a base. **Hy′drocyan′ic**, a. *-ăn′ĭk*, consisting of hydrogen and cyanogen.

HYDROCYANIC ACID, *hī-dro-sī-ăn′ĭk* (C_2NH or CyH): popularly known as **Prussic Acid**, from its having been obtained first by Scheele, 1782, from the substance known as Prussian or Berlin Blue: of almost equal interest to the chemist, the physician, and the toxicologist.

1. *Its Chemistry.*—Pure anhydrous H. A. is a limpid volatile fluid, with a specific gravity of 0·697 at 64° F. It boils at 80°, and solidifies into a crystalline mass at 5° F. its volatility is so great, that if a drop be allowed to fall on a piece of glass, part of the acid becomes frozen by the cold produced by its own evaporation. It possesses a very penetrating odor, resembling that of peach-blossoms or oil of bitter almonds. It burns with a whitish flame, reddens litmus paper slightly (its acid properties being feeble), and is very soluble in water and alcohol. Pure H. A. may be kept unchanged if excluded from light, which occasions its decomposition, and the formation of a brown substance known as paracyanogen.

H. A. is readily obtained by distillation from the kernels of bitter almonds, and many kinds of stone-fruit, from the leaves and flowers of various plants, and from the juice of the tapioca plant (*Jatropha manihot*). Anhydrous H. A. is obtained by the reaction of concentrated hydrochloric acid on cyanide of mercury.

The preparation of the dilute acid is, however, of much greater practical importance. The London, Edinburgh, Dublin, and United States pharmacopœias agree in recommending that it should be obtained by the distillation of a mixture of dilute sulphuric acid and ferrocyanide of potassium (known also as prussiate of potash). The distillate should contain nothing but H. A. and water, so that by the addition of more water, may be obtained an acid of any strength desired. Sometimes, however, a second, or even a third distillation is necessary. The dilute acid of the *Ph. Lond.* contains 2 per cent.; that of the *Ph. Dub.* rather more; that of the *Ph. Edin.* contains 3·3 per cent.; while what is known as Scheele's acid is very variable, but averages 4 per cent. of the anhydrous acid.

The ordinary tests for H. A. are 1, the peculiar odor; 2, the nitrate of silver test—there being formed a white precipitate of cyanide of silver, soluble in boiling nitric acid; 3, the formation of Prussian blue, by adding to the fluid under examination a solution of some proto- and per-salt of iron, by then saturating with caustic potash, and finally adding an excess of hydrochloric acid; when, if H. A. is present, we have a characteristic blue precipitate; 4, the sulphur test, the best and most accurate yet discovered. Let the suspected liquid be acidulated with a few drops of hydrochloric acid; place it in a watch-glass, and let a second watch-glass, moistened with a drop of a solution of hydro-sulphate of ammonia, be inverted over it; after a few minutes, let the upper glass be removed, and the moistened spot be gently dried. The whitish film which is left may consist merely of sulphur; when H. A. is present, it consists of sulphocyanate of ammonia. Let this residue be treated with a drop of a weak solution of perchloride of iron, when, if H. A. was present, a blood-red tint is developed, which disappears on the addition of one or two drops of a solution of corrosive sublimate. This is known as Liebig's test.

2. *Its Medicinal Uses.*—We are indebted to the Italians for the introduction of H. A. into the materia medica; and it was employed first at the beginning of the 19th c. There are no cases in which it is so serviceable as in those affections of the stomach in which pain is a leading symptom, as in gastrodynia, water-brash, and in intense vomiting. Hence it is often useful in English cholera, when opium has completely failed. In pulmonary diseases, it does not produce the good effects formerly ascribed to it; but it is sometimes useful in allaying spasmodic cough. It has been employed with advantage in chronic skin-diseases, to allay pain and irritation. A mixture of two drachms of the dilute acid (of 2 per cent. strength) with half a pint of rose-water, and half an ounce of rectified spirits, forms a good lotion. When given internally, the average dose is from 3 to 5 minims of the 2 per cent. dilute acid, three or four times a day; it must be administered in some milk vehicle, such as simple water, or orange-flower water

3. *As a Poison.*—H. A. is one of the most energetic poisons, and is frequently employed in murder and suicide. When a *small* poisonous dose (about half a drachm of the 2 per cent. acid) has been taken, the first symptoms are, weight and pain in the head, with confusion of thought, giddiness, nausea (sometimes vomiting), a quick pulse, and loss of muscular power. If death result, this is preceded by tetanic spasms and involuntary evacuations. When a *large* dose has been taken (as from half an ounce to an ounce of the two per cent. acid), the symptoms may commence instantaneously, and it is seldom

that their appearance is delayed beyond one or two minutes. 'When,' says Dr. A. S. Taylor, 'the patient has been seen at this period, he has been perfectly insensible, the eyes fixed and glistening, the pupils dilated and unaffected by light, the limbs flaccid, the skin cold and covered with a clammy perspiration; there is convulsive respiration at long intervals, and the patient appears dead in the intermediate time; the pulse is imperceptible, and the respiration is slow, deep, gasping, and sometimes heaving or sobbing.' The patient survives for a longer or a shorter period, according to the dose. According to Dr. Lonsdale, death has occurred as early as the *second* minute, and as late as the *forty-fifth* minute.

The parts specially affected are the brain and the spinal system. The affection of the respiratory system seems to be due to the influence of the acid on those parts of the nervous system from which the respiratory organs derive their nervous power. The immediate cause of death is, in most cases, the obstruction of the respiration; but in some cases, the stoppage of the heart's action.

Where the fatal action is so rapid, antidotes are of comparatively little value. Chlorine, ammonia, cold affusion, and artificial respiration are the most important agents in the treatment. The first two should be used with great caution, and only by the medical practitioner. Cold affusion on the head, neck, and down the spine is a valuable remedy, and it is asserted that its efficacy is almost certain when it is employed before the convulsive stage of poisoning is over, and that it is often successful even in the stages of insensibility and paralysis. Artificial respiration (see RESPIRATION, ARTIFICIAL) should never be omitted. Dr. Pereira states, that he once recovered a rabbit by this means only, after the convulsions had ceased, and the animal was apparently dead.

HYDROCYSTS, n. plu. *hī'drō-sĭsts* [Gr. *hudra*, a water-serpent; *kustis*, a bladder, a cyst]: in *zool.*, curious processes attached to the cœnosarc of the Physophoridæ, and termed feelers.

HYDRODYNAMIC, a. *hī'drō-dī·năm'ĭk* [Gr. *hudōr*, water; *dŭnămis*, power, force]: pertaining to or derived from the force or pressure of water.

HYDRODYNAMICS, *hī-dro-dī-năm'ĭks:* in a general sense, science which treats of the phenomena of water or other fluids at rest or in motion, thus including both *hydraulics* and *hydrostatics*. But in the strict sense it is usually applied to the laws of the motion of liquids; the flow of water from orifices and in pipes, canals, and rivers; its oscillations or waves; and its resistance to bodies moving through it. The term hydraulics (q.v.) is sometimes applied to the same subjects (see also HYDROSTATICS). The application of water as a moving power forms the practical part of Hydrodynamics.—In what follows, the illustrations are taken mostly from the case of water, but the principles established are true of liquids in general.

Efflux.—If three apertures, C, D, E, are made at different heights in the side of a vessel (fig. 1) filled with water, the liquid will pour out with greater impetuosity from C than from D, and from E than from C. The velocity does not increase in the simple ratio of the depth. The exact law of dependence is known as the theorem of Torricelli; the demonstration is too abstruse for introduction here, but the law itself is as follows: '*Particles of fluid, on issuing from an aperture, possess the same degree of velocity as if they had fallen freely, in vacuo, from a height equal to the distance of the surface of the fluid above the centre of the aperture.*' The jet from C, for instance, has the same velocity as if the particles composing it had fallen in vacuo from the level of the liquid to C. Now, the velocity acquired by a body in falling is as the time of the fall; but the space fallen through being as the *square* of the time, it follows that the velocity acquired is as the square root of the space fallen through. In the first second, a body falls 16 ft., and acquires a velocity of 32 ft. If E, then, is 16 ft. below the level, a jet from E flows at the rate of 32 ft.; and if D is at a depth of 4 ft., the velocity of the jet at D will be half the velocity of that at E, or 16 ft. In general, to find the velocity for any given height, multiply the height

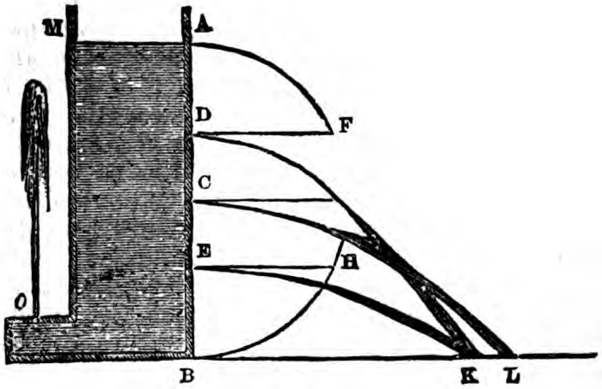


Fig. 1.

by 2 × 32, and extract the square root of the product. This rule may be expressed by the formula $v = \sqrt{2gh}$, in which v signifies the velocity of the issue, g the velocity given by gravity in a second, or 32 ft., and h the height of the water in the reservoir above the orifice. This last quantity is technically called the *head* or *charge*.

That this theory of the efflux of liquids is correct, may be proved by experiment. Let the vessel, MB (fig. 1), have an orifice situated as at *o*; the water ought to issue with the velocity that a body would acquire in falling from M to the level of *o*. Now, it is established in the doctrine of Projectiles (q.v.), that when a body is projected vertically upward with a certain velocity, it ascends to the same height from which it would require to fall in order to acquire that velocity. If the theory, then, is correct, the jet ought to rise to the level of the water in the vessel at M. It is found in reality to fall short of this; but not more than can be accounted for by friction, the resistance of the air, and the water that rests on the top in endeavoring to descend. When the jet receives a very slight inclination, so that the returning water falls down by the side of the ascending, ten inches of head of water may be made to give a jet of nine inches. A stream of water spouting out horizontally, or in any oblique direction, obeys the laws of projectiles, and moves in a parabola; and the range of the jet for any given velocity and angle of direction may be calculated precisely as in projectiles. The range of horizontal jets is readily determined by practical geometry. On AB describe a semicircle; from D, the orifice of the jet, draw DF perpendicular to AB, and make BK equal to twice DF; then it can be proved by the laws of falling bodies and the properties of the circle, that the jet must meet BL in the point K. If BE is equal to AD, the perpendicular EH is equal to DF; and therefore a jet from E will have the same range as that from D. Of all the perpendiculars, CG, drawn from the middle point C, is the greatest; therefore, the jet from C has the longest possible range.

The area of the orifice and the velocity of the flow being known, it is easy to calculate the quantity of water discharged in a given time. Thus, suppose the area to be 1 sq. inch, and the velocity 20 ft. a second, it is evident that there issues in a second a cylinder or a prism of water 1 sq. inch in section and 20 ft. long, the content of which is 1 × 240 = 240 cubic inches. In any given time, then, as three minutes (=180 seconds), the discharge is 240×180= 43,200 cubic inches.

It has as yet been assumed that the water in the vessel or reservoir is kept constantly at the same height, and that thus the velocity is constant. We have now to consider the case of a vessel allowed to empty itself through an orifice at the bottom. As the surface of the water sinks, the velocity of the discharge diminishes or is retarded; and when the vessel is of the same area from top to bottom, it can be proved that the velocity is *uniformly* retarded. Its motion follows the same law as that of a body projected vertically upward. Now, when a motion uniformly retarded comes to an end, the space described is just half what the body would have passed over, had it gone on uniformly with the velocity it had at the outset. Therefore, when the vessel has emptied itself in the way supposed, the quantity discharged is half what would have been discharged had the velocity been uniform from the beginning.

The 'Contraction of the Vein.'—When, by means of the area of the opening and the velocity thus determined, we calculate the number of cubic ft. or of gallons that *ought* to flow out in a given time, and then measure the quantity that actually does flow, we find that the actual flow falls short of the theoretical by at least a third. In fact, it is only the central part of the jet, which approaches the opening directly, that has the velocity above stated. The outer particles approach from all sides, with less velocity; they jostle one another, as it were, and thus the flow is retarded. In consequence of this want of uniformity in velocity and direction among the component layers of the jet, as they enter the orifice, there takes place what is called a 'contraction of the vein' (*vena contracta*); that is, the jet, after leaving the orifice, tapers, and becomes narrower. The greatest contraction is at a distance from the orifice equal to half its diameter; and there the section of the stream is about two-thirds the area of the opening. It is, in fact, the section of the contracted vein that is to be taken as the real area of the orifice, in calculating by the theory the quantity of water discharged. If the wall of the vessel has considerable thickness, and the orifice is made to widen gradually inward, in the proportions of the contracted vein, the stream does not suffer contraction, and the area of the orifice where it is narrowest may be taken as the actual area of discharge.

Adjutages.—It has as yet been supposed that the issue is by means of a simple opening or hole in the side or bottom of the vessel; but if the flow takes place through a short tube, the rate of discharge is remarkably affected. Through a simple opening, in a thin plate, the actual discharge is only about 64 per cent. of the theoretical; through a cylindrical conducting-tube, or *adjutage*, as it is called, of like diameter, and whose length is four times its diameter, the discharge is 84 per cent. The effect is still greater if the discharge-tube is made conical both ways, first contracting like the contracted vein, and then widening. The effect of a conducting-tube in increasing the discharge is accounted for by the adhesion of the water to its sides, which widens out the column to a greater area than it would naturally have. It has thus a tendency to form a vacuum in the tube, which acts like suction on the water in the reservoir, and increases the quantity discharged. The flow is more free if the orifice is in the bottom of the vessel, than in the side on a level with the bottom. If the discharge-tube is made to project inward beyond the thickness of the walls of the vessel, the velocity is much impeded, owing to the opposing currents produced by the water approaching the opening.

Pipes—When a conduit pipe is of any considerable length, the water issues from it at a velocity less than that due to the head of water in the reservoir, owing to the resistance of friction. With a pipe, for instance, of 1⅛ inch in diameter, and 30 ft. long, the discharge is only one half what it would be from a simple orifice of the same diameter. The rate of reduction depends on the diameter of the tube, its length, the bendings it undergoes, etc. The resistance to the flow of water in pipes does not arise properly from friction, as understood of solids, but from the adhesion of the water to the sides of the pipe, and from the cohesion of the watery particles among themselves; it makes little difference, therefore, whether an earthenware pipe, for instance, be glazed or not. Large projections form an obstacle; but mere roughness of surface is filled up by an adhering film of water, which is as good as a glaze. The resistance increases greatly with the narrowness of the pipes. Engineers have formulas, deduced in great part from experiment, for calculating the discharge through pipes of given length and diameter, and with a given head; but the subject is too complicated for introduction here. If water flowed in a conduit pipe without friction or other obstruction, so that its velocity were always equal to that due to the head of water, there would be no lateral or bursting pressure on the walls of the pipe; and if the pipe were pierced, the water would not squirt out. Accordingly, with a short tube or adjutage, which, instead of obstructing, increases the flow, there is not only no lateral outward pressure on the walls of the tube, but there is actually a pressure inward. If a hole is made in the wall of a cylindrical adjutage, A (Fig. 2), and the one end of a small bent tube, *bc*, is inserted in the hole, while its other end is dipped in a vessel of water, *V*, the water will be sucked up the tube, showing the tendency that the adjutage has to form a vacuum. But when the velocity of discharge is diminished by the friction of a long pipe, or by any narrowing, bending, or other obstruction in the pipe, then that portion of the pressure of the head of water that is not carried off in the discharge, becomes a bursting pressure on the walls of the pipe. This pressure is unequal at different parts of the pipe. At the end *e*, where the water issues free and unobstructed, it is next to nothing. and gradually increases toward the reservoir at *d*, where it is equal to the difference between the head of water in the cistern, and the head due to the velocity with which the water is actually flowing in the pipe. The principle now explained accounts for the fact, that pipes often burst or

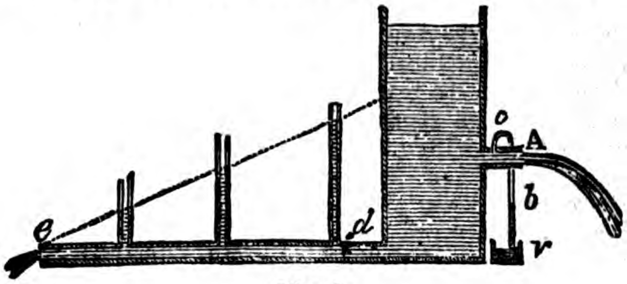


Fig. 2.

begin to leak on the motion of the water in them being checked or stopped.

Resistance of Water to Bodies moving through it.—This is greatly affected by the shape of the body, which ought to have all its surfaces oblique to the direction of the motion. When a cylinder terminates in front in a hemisphere, the resistance is only one-half what it is when the cylinder terminates in a plane surface at right angles to the axis; and if instead of a hemisphere, the termination is an equilateral cone, the resistance is only one-fourth. If a globe is cut in halves, and a cylinder, whose length and the diameter of whose base are each equal to the diameter of the globe, is fixed between them; this cylinder with hemispherical ends experiences less resistance than the globe alone, the diminution being about one-fifth of the resistance to the globe. Also the resistance increases in a higher ratio than the simple one of the velocity. One part of the resistance arises from the momentum that the body has to give to the water it displaces. Moving at a certain rate, it displaces a certain quantity; moving at twice that rate, it displaces twice the quantity in the same time. But not only does it displace twice the number of particles of water; it also has to displace them with twice the velocity; the pressure of the resistance is thus not merely doubled, but quadrupled or squared. Similarly, when the velocity is tripled, the resistance arising from the simple displacement of water becomes nine times as great. Another part of the resistance of liquids to bodies moving in them is owing to the cohesion of the particles, which have not to be thrown aside merely as separate grains, but to be torn asunder. In addition to this, when the velocity is considerable, the water becomes heaped up in front, and depressed at the other end from not having time to close in behind, thus causing an excess of hydrostatic pressure against the direction of the motion. Owing to the combination of these causes, the real law of the increase of resistance is difficult to investigate, and the results of experiments are not a little discordant. See WATER-POWER: WAVES.

HYDRŒCIUM, n. *hī-drē'shĭ-ŭm* [Gr. *hudra*, a water-serpent; *oikos*, a house]: the chamber into which the cœnosarc in certain of the Hydrozoa can be retracted.

HYDROFLUATE, n. *hī'drō flô'āt* [Eng. *hydrogen*, and *fluorine*]: a compound of hydrofluoric acid with a base HY'DROFLUOR'IC, a. *-ŏr'ĭk,* consisting of hydrogen and fluorine. HYDROFLUORIC ACID, volatile, fuming, and very corrosive liquid which dissolves most of the metals, and is employed extensively in etching on glass: see FLUORINE.

HYDROFLUOSILICIC ACID, *hī'drō-flô-ō-sĭ-lĭs'ĭk* [*hydro*, Eng. *fluor*, or *fluorine*, and *silicic*]: a powerful acid, a double fluoride of hydrogen and silicon, formed by the action of water on fluoride of silicon: it is used in testing for barium and potassium.

HYDROGEN, n. *hī'drō-jĕn* [Gr. *hudōr*, water; *gennăō*, I generate or produce]: an elementary substance constituting a metal, which, as a gaseous body, is the lightest of all known bodies—called also inflammable air, and producing water when combined with oxygen. **HYDROG'ENATE**, v. *-drŏj'ĕ-năt*, or **HYDROG'ENIZE**, v. *-nīz*, to combine hydrogen with. **HYDROG'ENATING**, or **HYDROG'ENIZING**, imp. **HYDROG'ENATED**, or **HYDROG'ENIZED**, pp. *-nīzd.* **HYDROG'ENOUS**, a. *-ĕ-nŭs*, pertaining to or containing hydrogen; formed by water; in *geol.*, applied to rocks formed by water, in opposition to *pyrogenous*, those formed by fire. **SULPHURETTED HYDROGEN**, a combination of hydrogen with sulphur, producing a gas having a smell like rotten eggs, found as a constituent of mineral waters.

HYDROGEN (symbol H. equiv. 1): an elementary substance, which exists as a colorless and inodorous gas (regarded as permanent till 1878). H. exists for the most part in combination with oxygen, as water. One of its most striking peculiarities is its specific gravity, it being the lightest of all known bodies. Assuming the weight of a given volume of atmospheric air to be 1, the weight of the same volume of H. under similar conditions is 0·0692; hence H. is 14½ times lighter than atmospheric air; while it is 241·573 times lighter than platinum, the heaviest body known. Its refractive power is greater than that of any other gas, and is more than 6 times as great as that of atmospheric air. It is combustible; that is to say, it is capable of combining with oxygen, and developing light and heat. When a lighted taper is passed up into an inverted jar of H., the gas burns quietly with a pale-blue, scarcely visible flame, and the taper is extinguished. The flame occurs only at the line of junction of the H. and the external air. If the H. be mixed with air or oxygen prior to the application of the taper, the whole mixture is simultaneously inflamed, and there is a loud explosion, most violent when 2 volumes of H. are mixed with 1 volume of oxygen, or with 5 volumes of atmospheric air. The H. and oxygen in these cases combine to form watery vapor or steam, which suddenly expands from the high temperature attendant on the combustion, but immediately afterward becomes condensed; this condensation causes a partial vacuum, into which the surrounding air rushes. The sudden change of volume produces the report. At ordinary temperatures, water dissolves rather less than 2 per cent. of its volume of hydrogen. H. was liquified for the first time, 1878, and even solidified (see GASES). Pure H., though it cannot support life, is not poisonous, and when mixed with a sufficient quantity of atmospheric air or oxygen, may be breathed for some time without inconvenience.

The only substance with which H. combines directly at ordinary temperatures are fluorine, chlorine, and oxygen. H. and chlorine, mixed together, and exposed to direct sunlight, combine with explosion; in diffused daylight, they gradually unite; but in the dark do not act on one another. H. and oxygen do not combine spontaneously even in direct sunlight, but require the presence of a red-hot solid, of flame, or of spongy platinum.

It is generally stated that H. does not exist naturally in a pure or uncombined state, but Bunsen recognized its presence in variable proportions in the gases evolved from the solfataras of Iceland, and it will probably be detected in other localities under similar geological relations. In combination with oxygen, as water, it not only forms a very considerable part of the earth and of the atmosphere, but enters largely into the structure of every animal and vegetable organism. It is an essential ingredient of many inflammable minerals, such as coal, amber, and petroleum; and of an immense number of gases, such as marsh gas, ammonia, and hydrosulphuric acid (or sulphuretted hydrogen). It likewise enters into the composition of a large number of manufactured substances and products used in the arts, medicine, etc., as for instance, sal-ammoniac, starch, sugar, vinegar, alcohol, olefiant gas, aniline, indigo, morphia, strychnia, hydrocyanic acid, etc.

There are numerous ways in which H. may be prepared, but the usual and most convenient process is by the action of diluted sulphuric acid on zinc. About half an ounce of granulated zinc is placed in a retort, and a dilute acid, prepared by gradually mixing an ounce of oil of vitriol with six ounces of cold water, is poured on the zinc. H. gas is rapidly evolved in great abundance, but the first portions should not be collected, since they are mixed with the atmospheric air which was contained in the retort. The rest of the gas may be collected in the ordinary way over water. In this process the zinc takes oxygen from the water, and forms oxide of zinc, which combines with the sulphuric acid, forming sulphate of zinc, which remains in solution, while the H. of the decomposed water escapes. The reaction is shown in the formula $Zn + H_2SO_4 = ZnSO_4 + 2H$. A precisely similar reaction ensues if we use iron in place of zinc, but in this case the gas is generally less pure.

H. gas, under the name of combustible air, was obtained in the 16th c. by Paracelsus by treating certain metals with dilute acids, and was more or less known to Boyle and others; but Cavendish, in his paper on 'Factitious Airs,' published in the *Transactions of the Royal Soc.* for 1766, was the first to describe accurately the properties of this gas, and the methods of obtaining it; hence he is usually mentioned as its discoverer.

HYDROGEN, BINOXIDE OF (symb. H_2O_2, equiv. 34): colorless liquid of a syrupy consistence, with specific gravity of 1·45 (water being 1), and a peculior odor, something like that of a very dilute chlorine. It bleaches vegetable colors, and when applied to the tongue or the skin, produces a white spot, and excites considerable pain. From the readiness with which it gives off its oxygen, it is a powerful oxidizing agent. The method of preparing it is complicated and difficult. This substance was discovered 1818 by Thenard, who termed it oxidized water. Dr. B. W. Richardson, eminent London physician, has lately examined its value (in solution) as a therapeutic agent, and has found it of very beneficial in hooping-cough, in certain forms of rheumatism, and (as a palliative) in the last stages of consumption.

HYDROGNOSY, n. *hī-drŏg'no-sĭ* [prefix, ***hydro-;*** Gr. ***gnosis***, knowledge; *gignōskō*, I know]: a treatise on, or a history and description of, the waters of the earth.

HYDROGRAPHY, n. *hī-drŏg'ra-fĭ* [Gr. ***hudōr***, water; *graphō*, I describe or write]: art of forming charts representing sea-coasts, seas, gulfs, bays, islands, etc. **HY'DROGRAPH'IC**, a. *-drō-grăf'ĭk*, or **HY'DROGRAPH'ICAL**, a. *-ĭ-kăl*, relating to maps or charts representing sea-coasts, rocks, islands, shoals, etc. **HYDROG'RAPHER**, n. *-drŏg'ră-fėr*, one who. **HYDROL'OGY**, n. *-drŏl'ŏ-jĭ* [Gr. ***logos***, discourse]: the science which treats of water, its properties, phenomena, and distribution. **HY'DROLOG'ICAL**, a. *-drō-lŏj'ĭ-kăl*, pertaining to.

HYDROGRAPHY, *hī drŏg'ra-fĭ:* maritime surveying; description of the surface waters of the earth, particularly of the bearings of coasts, gulfs, bays, of currents, soundings, islands, shoals, etc., so far as may be useful in navigation; including therefore the construction of charts, maps, etc., in which these particulars are detailed. Besides its practical use in navigation, it has reference also to science generally. H. is to the sea what geography is to the land. The first step in the erection of H. into a science, was made in the 15th c. by Henry the Navigator, the first to construct a sea-chart worthy of the name. Among maritime nations H. is now made a matter of prime concern; the hydrographic office being an important branch of the naval administration. The head of the hydrographic dept. in the British service is usually a capt. in the royal navy. The officers surveying in different parts of the world send their observations, soundings, etc.; and it is the business of the hydrographer to consolidate these into available maps. In the United States the H. is in charge of the coast survey; there is a coast survey office, and in 1866, a hydrographic office was established. See **COAST SURVEY: GEODESY: TRIANGULATION: SOUNDING, DEEP SEA: DREDGE—DREDGING: ATLANTIC OCEAN: PACIFIC OCEAN: CHALLENGER EXPEDITION.**

HYDROIDA, n. plu. *hī-droy'dă*, also **HYDROIDS** [G. *hudra*, a water-snake; ***eidos***, resemblance]: in ***zool.***, the typical sub-class of the Hydrozoa which comprises the animals most nearly allied to the hydra. They have an alimentary region or polypite provided with an adherent disk or hydrorhiza, and prehensile tentacles. Unlike hydra, the type of the sub-class, most of the hydroida live in societies, each of which constitutes a polypidom so like a seaweed that it is often collected as such. But while the apertures on an ordinary seaweed are only minute pores, the hydroida have little cup-like cells along the stem and at the extremities of the branches, in which the individual polype lives. The cells have a small hole at the bottom, and the stalk is hollow, so as to enable the individual polypes to remain part of a compound organism. The sub-class is divided into five orders, Hydrida, Corynida, Sertularida, Campanularida, and Thecomedusæ. The Polyzoa or Bryozoa, once ranked with the sub-class, now figure as a distinct class, arranged under the sub-kingdom Molluscoida: see ACALEPHÆ: GENERATIONS, ALTERNATION OF.

HYDROKINET'ICS: see HYDRODYNAMICS.

HYDROLITE: see GMELINITE.

HYDROLOGY: see under HYDROGRAPHY.

HYDROMAGNESITE, n. *hī'drō măg'nĕ-sīt* [Gr. *hudōr*, water; Eng. *magnesite*]: a native carbonate of magnesia, occurring in white earthy amorphous masses in serpentine rocks.

HYDROMANCY, n. *hī'drō-măn'sĭ* [Gr. *hudōr*, water; *manteia*, divination]: method of predicting events by water, practiced by the ancients (see DIVINATION). HY'DROMAN'TIC, a. *-tĭk*, relating to.

HYDROMA'NIA: see PELLAGRA and SUICIDE.

HYDROMECHANICS, n. *hī-dro-mĕ-kăn'ĭks* [prefix *hydro-;* Eng. *mechanics*]: in *nat. science*, the mechanics of water and fluid in general; hydrostatics, hydrodynamics, and hydraulics are branches of hydromechanics.

HYDROMEL, n. *hī'drō-mĕl* [Gr. *hudōr*, water; *meli*, honey]: honey mixed in water, called mead when fermented.

HYDROMETALLURGY, n. *hī-drō-mĕ-tăl'ėr-jĭ* [prefix *hydro-;* Eng. *metallurgy*]: the wet process of extracting metals from ores, in distinction to the hot process.

HYDROMETAMORPHISM, n. *hī-dro-mĕt-a-mawrf'ĭzm* [prefix *hydro-;* Eng. *metamorphism*]: in *geol.*, metamorphism produced mainly by the operation of water, as opposed to pyrometamorphism, effected chiefly through the action of fire.

HYDROMETEOR, n. *hī-dro-mē'tē-ėr* [prefix *hydro-;* Eng. *meteor*]: a meteor produced by water in some form, the term meteor being used in its original sense of anything seen in the air as distinguished from the ground. Rain, snow, hail, etc., all are hydrometeors.

HYDROMETER, n. *hī-drŏm'ĕ-tėr* [Gr. *hudōr*, water; *metron*, a measure]: an instrument for ascertaining the density, strength, etc., of liquids. HY'DROMET'RIC, a. *-drō-mĕt'rĭk*, or HY'DROMET'RICAL, a. *-rĭ-kăl*, pertaining to a hydrometer. HYDROM'ETRY, n. *-drŏm'ĕ-trĭ*, the art of ascertaining the density, etc., of liquids: see AREOMETER. HYDROMETRIC-PENDULUM, n. a current-gauge. An instrument consisting of a ball suspended from the centre of a graduated quadrant, and held in a stream to mark by its deflection the rate of motion of the water.

HYDROMETRA, n. *hī'drō-mē'tră* [Gr. *hudōr*, water; *mētra*, womb]: an excessive secretion and accumulation of fluid within the cavity of the uterus.

HYDROMETRA, n. *hī-drŏm'ē-tra* [prefix *hydro-;* Gr. *metron*, a measure]: typical genus of the family *Hydrometridæ*, a family of Heteroptera, tribe *Geocorizæ* (land-bugs). It seems like a contradiction in terms to name the genus from the water and the tribe from the land, but the *Hydrometridæ* do not swim like the water-bugs, they only walk on the surface of the water by means of their long legs.

HYDROMETROGRAPH, n. *hī-dro-mĕt'ro-grăf:* instrument for determining and recording the amount of water issuing from a pipe, etc., in a given time.

HYDROMYS, *hī'drō-mĭs:* genus of rodent quadrupeds, of the family *Muridæ*, of which there are only two known species, very similar to one another, natives of Tasmania. They have two incisors and four molars in each jaw. They are called BEAVER RATS in Tasmania; are nocturnal and very shy; inhabit the banks of both fresh and salt water, and swim well. The largest species is twice the size of a common rat. One has the belly white, the other yellow.

HYDRONEPHROSIS, n. *hī'drō-nĕf-rō'sĭs* [Gr. *hudōr*, water; *nephros*, kidney]: dropsy of the kidney, caused by any permanent obstruction of the ureter.

HYDRONETTE, n. *hī'drō-nĕt* [Gr. *hudōr*, water]: a garden implement for watering flowers.

HYDROPATHY, n. *hī-drŏp'ă thĭ* [Gr. *hudōr*, water; *pathos*, feeling]: the water-cure. HYDROPATHIC, a. *hī'drō-păth'ĭk*, relating to. HYDROP'ATHIST, n. *-ă-thĭst*, one who practices the water-cure.—HYDROPATHY, or HYGIENIC MEDICINE, is popularly termed the WATER-CURE. For the bath in general, as a means of preserving health, see BATH—BATHING. We have here to speak of water in its manifold uses in the cure of disease, and as a principal element in that combination of hygienic appliances pertaining to hydropathy as at present practiced. [This is here set forth by an adherent of the system.]

The efficacy of water, in the cure of numerous forms of disease, has long been recognized. Water was largely employed by Hippocrates, the 'Father of Medicine,' more than 2,300 years ago, in the treatment of many kinds of disease; and with a regulated diet, and an implicit belief in the *vis medicatrix naturæ*, it appears to have formed the chief among his medical appliances. Horace has enshrined the memory of Antonius Musa, the hydropathic physician of Emperor Augustus (Epist. i. 15). Both Celsus (about B.C. 50), and Galen (2d c.), speak favorably in their writings of the use of water in the cure of disease, regarding it as of high value in the treatment of acute disorders, particularly fevers. Through the middle ages, likewise, many physicians of name, including Aetius and Paulus Ægineta, and the more celebrated Paracelsus, were advocates of the remedial virtues of water; all, however, having faith in its uses in the treatment rather of acute than of chronic disorders. In 1723, Nicolo Lanzani, Neapolitan physician, published a learned treatise on the subject. In Britain, about the beginning of the 18th c., Sir John Floyer and Dr. Baynard made large use of water. Their joint work, *Psychrolousia*, or the 'History of Cold Bathing, both Ancient and Modern,' is replete with quaint learning and practical shrewdness and sagacity. But the most able and scientific among the older treatises in England on the subject of the water treatment, is the work of the well-known Dr. Currie (q.v.), biographer of the poet Burns, published 1797, entitled *Medical Reports on the Effects of Water, Cold and Warm, etc.* In this work, Dr. Currie recommends the cold affusion in typhus and other fevers, and gives practical directions in regard to the cases and the times when it may be used with advantage. Eminent physicians of the present day have admitted that these views, so far as they went, were as scientific in principle as they were novel; but the practice founded on them was considered too dangerous by Currie's contemporaries, and fell into speedy neglect. It is worthy of remark, that Currie appears to have limited his use of water to acute ailments exclusively.

Thus, till the beginning of the present century, by some of those who employed water as a curative agent, it was used in the treatment of acute, and by others of chronic diseases; by some as an internal agent alone, by others as an external application in the various forms of the bath, but never in all the manners combined. This combination was effected first by the orignal genius of Vincent Priessnitz, a Siliesian farmer, with whom began a new era for the water cure. It was owing, we are told, to his successful treatment of more than one bodily injury which he had sustained in his own person that, about 1820, Priessnitz became so fortified in his convictions as to the curative powers of water as to devote himself to employ it medically in the cure of others. Beginning with the external application of water for trifling diseases among the poor of his neighborhood, he gradually undertook an extended range of cases, and multiplied the modes of administration, introducing the wet compress, the douche bath, partial baths of all kinds, the sweating process, the wet sheet, together with copious drinking of pure water. In addition to water in all these forms, he insisted on the value of exercise, diet, fresh air, and mental repose, in the cure of disease; thus practically calling to his aid the entire resources of hygiene, and establishing by a simple, yet thoroughly original combination, nothing less than a new system of medical treatment. As to the success which attended Priessnitz's practice, it is a historical fact that of 7,500 patients, who had gone to Gräfenberg for advice and treatment, to the year 1841, or within about 20 years, there had been only 39 deaths, and some of these, according to the registry of the Austrian police, 'had died before commencing the treatment, while some others were reported in a forlorn state before anything was attempted.' It is to be regretted, however, that the founder of the new system was not himself an educated physician, so that he could have understood better the philosophy of his own practice, and explained it more correctly. He would not have called his system the 'Water cure,' a name scientifically one-sided and incomplete, and therefore misleading. It is equally to be regretted that many of the immediate followers of Priessnitz, while destitute of his remarkable sagacity and genius, should have been no better furnished than himself with scientific knowledge of disease and general professional culture.

In spite of all drawbacks, however, the undoubted merits of hydropathy at length called to its defense many men of standing in the profession, who, allowing for some of its early extravagances, stood forth to explain it scientifically, and pressed it on the acceptance of their brethren; and from their advocacy has sprung up in England and America a school of hydropathic physicians, the philosophy of whose plan of treatment we shall now briefly describe.

Physiology teaches, that the various organs of our bodies cannot be kept in a healthy state without the observance of certain regulations called the primary 'Laws of Health.' When these are broken, the result to the offender is disease in one of it smany forms. Until the appearance of hydropathy, physicians attempted to correct the evil thus caused—and the great majority do so still—by the administration of one or other of the drugs which go to form the medical repertory known as the pharmacopœia; and the argument on which this practice has been based is the very simple one, that experience has proved the medicine or medicines to be efficacious in a large proportion of similar cases. Hydropathy proceeds according to a very different method. Taking as his central maxim the principle first propounded by Hippocrates, that it is nature s own strivings after health (*vis medicatrix naturæ*) that really cure the patient when he is cured, the function of art being mainly to remove obstacles, the hydropathic physician avoids using all means with whose effects he is not thoroughly conversant, or which may, at least, interfere with nature's own operations. Hence, as a rule, he eschews the use of drugs, and betakes himself to those more simple natural agents which, in their totality, receive the name of hygiene. The conditions of health, as unfolded by physiology, may be briefly stated to consist of five necessary requirements—air, exercise, water, diet, and nervous repose. These are undeniably essential to the preservation of health; no human being can possibly continue in a fair state of health when deprived of the just proportion of any one of them. This proposition which may be regarded as axiomatic, forms the starting point of hydropathy in the cure of disease. Admitted that certain agencies are necessary to the preservation of health, the hydropatic principle is simply this, that the very same agencies, infinitely modified of course according to the requirements of each particular case, and generally much intensified, are not only the safest, but by far the surest means of curing chronic disease; or, to put it more correctly, are the best means which can be brought to nature's assistance for enabling her to effect a cure herself.

Here it is proper to explain what is meant by saying that the natural agents of health are *intensified* when they are used, not for the preservation of health, but the cure of disease; or, in other words, when we pass from natural hygienics to natural therapeutics. Take the element of exercise, for instance, one of the most powerful hydropathic agencies. Every one knows, although but few act systematically on the knowledge, that a certain amount of exercise is necessary to maintain the body in health; the hydropathic doctrine, accordingly, is that in the cure of chronic disease, this exercise must be intensified—increased to the full extent which the patient's strength will warrant. So, again, as to the use of water: a certain amount of pure water, used externally and internally, is also necessary to the maintenance of health; hydropathically, a much more liberal use of the same element in both ways is necessary to the cure of disease. Special attention should be given to this, which in fact is the very kernel of the hydropathic theory.

Let us now explain more in detail how and in what cases hydropathy employs the agents on which it relies. Diseases may, for general purposes, be divided into two great classes: those in which the physician is called on to lower or *reduce* to the standard of health; and those in which the object of his endeavors is, on the other hand to assist in *elevating* to the same standard. In the former category, range themselves all those diseases which are marked by a plethoric or inflammatory type—by an overplus of mal-directed strength in the economy; in the latter, those distinguished by a corresponding diminution in the vital powers. It may be truly affirmed, that to rectify both these abnormalities, and to restore the equilibrium of health, is the great object of medical treatment. The ordinary practice seeks to achieve this object mainly, in both instances, by means of drugs, respectively adapted to the two classes, and tending to lower in the one case and to exalt in the other. The hydropathic practice, with the same object in view, employs, as already stated, the natural remedies—air, exercise, water, diet, and repose.

Thus, in dealing with acute and plethoric complaints, and the whole order of diseases ranging themselves under the former of the divisions just indicated (i.e. in which *reduction* to the standard of health is demanded), water is the element which enacts by far the most conspicuous part; and the application of it most serviceable in these cases is the *wet sheet* or *pack*. Indeed, the discovery by Priessnitz of this application of water was perhaps the most important contribution which he made to the new system of which he was the practical founder, inasmuch as it at once supplied one of the most powerful and at the same time one of the safest methods of combating almost every form of acute disease. This, the most distinctive of hydropathic appliances, may be thus described: Over the mattress of a bed or sofa is extended a stout blanket, and on this is spread a linen sheet, well wrung out of cold water, so that it is only damp. On this the patient is laid, and immediately enveloped tightly with a heavy weight of blankets upon him, tucked in so closely as to completely exclude all air. The body's natural heat acting on the damp linen, generates vapor almost immediately, and the patient forthwith finds himself, not in a cold, but in a comfortably warm vapor bath—in a novel, but by no means unpleasant form of body poultice. The effects of this process on the economy seem plain enough. It is clear, in the first place, that the pores of the skin, so numerous and performing so important a function, must thereby be thoroughly cleansed, and the blood itself depurated; with the equalization of temperature over the entire surface of the body, will follow a corresponding equalization in the distribution of blood through out the system, thereby relieving internal congestions wherever occurring; and lastly from the soothing effects on the nervous system, and the allaying of all irritation, must result not only the alleviation of pain, but that lowering of the heart's action, and with it of the circulation of the blood, of such incalculable importance in the treatment of many forms of disease, and especially of fevers. Such is the wet sheet.

Of the same order of remedy, though in many respects very different from it is the Turkish bath, recently introduced into w. Europe and N. America, and now fairly established. In this bath the hydropathic procedure has received a most important auxiliary in the treatment of many forms of disease, but in an especial manner of the kind now particularly under consideration, such as gout, rheumatism, bronchitis, and other complaints of an inflammatory or febrile character. The same end of diaphoresis, or sweating, is secured, though not so efficiently, by means of the vapor bath as used by the Russians, and by hot air as generated by the spirit-lamp. The latter has the advantage of being less expensive, and the bather not being required to breathe the heated air, many persons can use it who would be quite unable to respire, without faintness, the highly heated atmosphere of the Turkish bath. In addition to the above, must be mentioned the use of warm fomentations, in the form of flannels wrung out of boiling water—a kind of application much relied on for subduing local pain proceeding from whatever cause, for relieving congestion, and abating and checking inflammation. So much for the principle hydropathic operations employed to treat acute and inflammatory diseases—processes corresponding in their aims and effects to antiphlogistic, diaphoretic, and sedative drugs.

We have now to speak of the hydropathic agents brought to bear on the second great division of maladies, wherein the object is not to lower, but to elevate, to the standard of health. In the former class of cases, it was stated that water was the agent most prominently brought forward, and it is in such diseases alone that the term 'water-cure' is at all appropriate. In those to which we now refer, water certainly acts an important part in the cure, but only in combination with good air, exercise, regulated diet, and nervous repose. As an illustration: A cold bath is given in the usual way as a tonic. Its effects are admirable under certain conditions—the first and chief of these being that a good reaction takes place; that the blood, which had been driven by the constringent effects of the cold water from the surface of the body into the inner parts, should return in increased force when the stimulus of cold is withdrawn. But to this end, in all but very strong persons exercise immediately after the bath is indispensably necessary, and must follow it as a matter of course, or the bath cannot be administered with comfort, or even with safety. As much might be said for the co-operative importance of pure air, of diet, and of nervous repose, all of them, if necessary to the preservation of health, then of tenfold importance in the cure of disease. Thus the highly tonic properties of the bath, administered in its various forms, and followed by a due proportion of exercise, especially in strong bracing air, produce at once a marvellous effect in sharpening the appetite and improving the powers of digestion, so that, if simple and nourishing diet is administered, better blood will be elaborated, and, consequently, every tissue of the body be more highly nourished and invigorated. In all cases, this is and must always be a gradual process, for it is evident that the treatment, whether in reference to exercise, diet, or the use of the stimulus of water, must bear an accurate relation to the invalid's strength. Little by little, however, and in most cases much more rapidly than might be expected, improvement begins. From the great action brought to bear on the skin by the different applications of water, the prudent use of the Turkish bath, and the effects of full exercise, a rapid change of the particles of the body takes place—so rapid, that, according to Liebig, 'by means of the water-cure treatment, a change of matter is effected in a greater degree in six weeks, than would happen in the ordinary course of nature in three years'—while the effete matter thrown off is replaced by the more healthful materials supplied to the economy by an improved quality of blood, itself the result of an improved digestion, and this, again, resulting from the heightened *vis vitæ* which the combined hydropathic agencies have produced. The forms of the bath may of course be varied *ad infinitum*, as well as its power according to the temperature of the water. The baths most in vogue in daily practice are technically denominated the *Wash down*, *Dripping sheet*, *Shallow*, *Sitz bath*, and *Douche*, together with the *Pack*, or *Wet sheet* above mentioned; in addition to which there is a catalogue of local applications, too extensive to enumerate. These various appliances of water are capable of producing extraordinary effects on the economy, constituting, as they do, especially when conjoined with exercise, the most powerful tonics, and, at the same time, the most safe and agreeable, that can be brought to bear on the body. It might truly be added that, in the treatment of chronic disease, this same element, water, is capable of becoming, according to the manner and quantity of its use, internally and externally, an alterative, derivative, diuretic, and diaphoretic. It is as a tonic and stimulant, however, that its virtues are most conspicuous, and most called into requisition for the cure of chronic ailments.

From a variety of circumstances, the system of hydropathic medicine has been greatly misunderstood and misjudged by the general public. For one thing, the name of 'water cure,' or 'hydropathy,' adopted by Priessnitz, has been very prejudicial, as leading to the false inference that the one element of water alone constitutes the bone and marrow of the system, playing the part of a panacea for every form of human ailment. Such a notion has never been maintained by the practitioners of scientific hydropathy, and it is matter of regret that some more comprehensive and catholic title, as that of 'hygienic medicine,' has not long since been adopted. As it is, the prejudice against the system is gradually giving way; it is no longer treated as heresy by the orthodox profession; and many enlightened practitioners are in the habit of sending certain classes of their patients to hydropathic establishments, and even subject themselves to the treatment. In fact, the tendency of ordinary medical practice has of late years been toward the principles on which hydropathy is based. A manifest disposition exists on the part of the more enlightened members of the profession to rely much less on art and much more on nature in the treatment of diseases of every type, but especially those of chronic character; and as the practitioners of scientific hydropathy by no means exclude the use of drugs, when drugs appear necessary, a convergence of opinion seems really coming about.

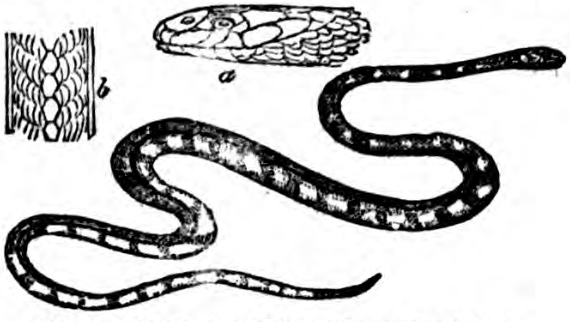
Hydropathy, hitherto, has been practiced almost exclusively in large establishments, presided over by competent medical men, and dedicated to a thorough and systematic carrying out of the principles on which the system of cure is founded. There can be no question that this is by far the most complete and satisfactory arrangement when it can be accomplished. But the power of leaving their daily work for the purpose of seeking health, is given to very few; and if the hydropathic treatment were to be absolutely limited to its chosen retreats in the country, and incompatible with the business and work of town-life, it would be shorn of half its utility as a remedy, and be a luxury to which only the rich and disengaged could aspire. But exercise, morning and evening, can usually be had by most persons. The same applies to the systematic and persistent use of the bath, to the regulation of diet, and the observance of early hours. By these means, even without country air and other hygienic adjuncts, no doubt much might be done both for cure of disease and for preservation of health. Toward effecting the latter object, at least, no one will deny the immense value of hydropathy. No one, having any practical acquaintance with it, can doubt its influence in the promotion of those habits of temperance, cleanliness, self-denial, and general obedience to the laws of health, which, while they tend so much to the happiness of the individual, tend no less to secure the strength and prosperity of nations. Those who would inquire further into the subject, may consult the work of Dr. Gully, *The Water-cure in Chronic Disease;* that of Dr. James Wilson, *Principles and Practice of the Water-cure;* the several works of Dr. Edward Johnson; and Dr. Lane's treatise, *Hydropathy, or Hygienic Medicine.*

HYDROPERICARDIUM, n. *hī'drō-pĕr-ĭ-kâr'dĭ-ŭm* [Gr. *hudōr*, water; *peri*, round about; *kardĭă*, the heart]: an effusion of serum into the sac of the pericardium or membrane inclosing the heart; dropsy of the pericardium.

HYDROPHANE, n. *hī'drō-fān* [Gr. *hudōr*, water; *phainō*, I show]: a variety of opal, pearly opaque when dry, but rendered translucent when saturated with water. HYDROPH'ANOUS, a. *-drŏf'ă-nŭs*, made translucent by water.

HYDROPHIDÆ, *hī-drŏf'ĭ-dē:* family of water-serpents, sometimes defined to include numerous fresh-water snakes not venomous, and sometimes limited to venomous sea-serpents, inhabiting the Indian, Chinese, and tropical Australian seas. These sea-serpents, forming the genus *Hydrophis* (or *Hydrus*), and other genera recently separated from it, have the tail compressed and the belly keeled, so that they have the power of swimming like eels; they have small heads and small eyes; they are remarkable for the large size of their nasal shields; they are generally of yellowish-green color, varied with blackish rings or lozenge-shaped spots.

Their lungs are often prolonged into a reservoir of air as far as the commencement of the tail. They are often from two to five ft. long. They are frequently seen asleep on the surface of the sea, and are easily caught in this condition, in which, apparently, they often fall a prey to sharks. They are supposed to live on small fishes and crustaceans. They are sometimes found coiled up among sea-weed on the shore, and are much dreaded by fishermen. In some places they are very numerous. One species, at least, is esteemed good food by the Tahitians. More than 50 species are known.



Banded Sea Snake (*Chersydrus Fasciatus*):
a, head ; *b*, part of back.

HYDROPHILIDÆ, *hī-drō-fĭl'ĭ-dē:* water-beetles; family of pentamerous beetles, more truly aquatic than the allied Helophoridæ. The body is oval, or somewhat rounded, sometimes almost globose. Though the larvæ are carnivorous, the developed insect feeds on vegetable matter in decay: see COLEOPTERA.

HYDROPHITE, n. *hī'dro-fīt* [prefix *hydro-;* Gr. *ophis*, a serpent, a snake]: green translucent or opaque mineral, of sub-vitreous lustre, occurring massive or in fibrous crusts; found at Taberg in Småland, in Sweden, and in Orange co., N. Y.; called also Jenkinsite.

HYDROPHOBIA, n. *hī'drō-fō'bĭ-ă* [Gr. *hudōr*, water; *phobos*, fear, dread]: a preternatural dread of water; a dreadful and almost incurable disease generally caused by the bite of a rabid dog. HY'DROPHO'BIC, a. *-fō'bĭk*, pertaining to dread of water or to canine madness.

HYDROPHOBIA, *hī-drō-fō'bĭ-a:* one of the diseases produced by animal poisons. A person is bitten by a mad dog or other animal. The wound gradually heals in the ordinary manner. After an uncertain interval, usually ranging from six weeks to eighteen months, termed the period of *incubation*, the following symptoms appear: The patient experiences discomfort or pain at the seat of the bite. The cicatrix tingles, or feels stiff or numb; sometimes becomes swelled and livid, and occasionally reopens, and discharges a peculiar ichor. The morbid sensations gradually extend from the original seat of injury toward the trunk. This period is termed the stage of *recrudescence.* Within a few hours, or, at longest, a very few days after the exhibition of this local irritation, during which time the patient has a sense of general discomfort and illness, the specific constitutional symptoms begin to manifest themselves; he complains of pain and stiffness about the neck and throat, finds himself unable to swallow fluids, and every attempt to do so—often even the sight or the sound of fluids—brings on a terrible paroxysm of choking and sobbing; and this continues two or three days, till the patient dies from pure exhaustion. The passage of a gust of wind across the face, or the waving of a mirror before the eyes, is often sufficient to excite these paroxysms. The mental condition in the last stage of this disease varies; the patient may be calm and tranquil; generally he is irritable and apprehensive, and suspicious; and in most cases, a certain degree of delirium, or even mania, is associated with irritability. Death usually takes place on the second or third day after the commencement of the specific symptoms.

Some medical writers have maintained that H. may occasionally be spontaneously developed in man, as is undoubtedly the case occasionally in the lower animals, e.g., the dog and wolf; but even if this ever occurs, the instances are so extremely rare as not to affect the general statement, that in man the disease is the result of an animal poison, communicated usually by the bite of a dog, but which has been produced also by the bite of the wolf, jackal, raccoon, and cat. The poisonous saliva is perfectly innocuous when applied to the unbroken skin; to produce its effects, there must be some abrasion of the cuticle. It has, however, been maintained that the poison may enter the system by mere contact with the mucous membrane; and that the disease has been caused by the *scratch* of a cat. In the latter case, the poisonous saliva might have come from the mouth on to the claws.

Till of late H. was considered incurable; the development once begun, could not be checked. At most, the distressing symptoms could be alleviated by chloroform, opiates, and the copious use of the hot-air bath. But since 1885, M. Pasteur, of Paris, claims not merely to have succeeded in rendering dogs or other animals safe against the bites of rabid animals by the careful and repeated injection of attenuated virus (see RABIES), but also that by the inoculation of men with such virus, even after they have been bitten by rabid animals, he can anticipate the slow incubation of the disease caused by the bite, and by producing quickly a mild form of disease, wholly prevent the deadly and distressing illness. Numerous patients were treated 1885,6; and with success, it is affirmed, wherever the conditions were favorable.

The success of the method was disputed; and though numerous operations by Pasteur have since done much to authenticate it, so that it has recently gained large scientific and popular advocacy, it is still desirable that the first development of the disease should be prevented by early and complete excision of the bitten part, provided the situation of the bite allows the free use of the knife. 'If,' says Dr. Watson, 'the injury be so deep or extensive, or so situated that you cannot remove the whole surface of the wound, cut away what you can; then wash the wound thoroughly and for some hours together, by means of a stream of warm water, which may be poured from a tea-kettle; place an exhausted cupping-glass from time to time over the exposed wound; and finally apply to every point of it a pencil of lunar caustic. If you cannot bring the solid caustic into contact with every part, you had better make use of some liquid escharotic; strong nitric acid, for example.' Early excision is the only sure preventive, but if, for any reason, the operation has been omitted in the first instance, it is advisable for the reasons already given regarding the probable latency of the poison, to cut out the wound at any period before symptoms of recrudescence appear. The reason why many neglect to have immediate recourse to excision probably is, that H. is not certain to follow the bite of a rabid animal. John Hunter states that he knew an instance in which, of 21 persons bitten by a mad dog, one alone was infected. On the other hand, we have evidence that of 114 persons bitten by rabid wolves, 67, or more than one-half, were victims to this disease. Although we have no trustworthy evidence on a large scale, there is no doubt that the majority of persons who are bitten by a mad dog do escape the disease, even without taking any precaution. In many of these cases, the virus is probably removed from the teeth in their passing through the clothes. For the nature of the disease in the dog or other animal whose bite causes H., see Rabies.

HYDROPHTHALMIA, n. *hī-drŏf-thăl'mĭ-ă* [Gr. *hudōr*, water; *ophthal'mos*, an eye]: dropsy of the eye.

HYDROPHYLLACEÆ, *hī-drō-fĭl-lā'sē-ē:* natural order of exogenous plants, containing about 80 known species, natives chiefly of the colder parts of America. None are of importance for any use; though *Hydrophyllum Canadense* has been reputed in N. America a remedy for snake bites; and the leaves of *H. Virginicum*, or Shawanese Salad, are eaten by the Indians, both raw and boiled; but some of them are favorite ornaments of flower-borders, particularly different species of *Nemophila*. The order includes some small trees and bushes as well as herbaceous plants. They are often hipsid, like the *Boraginaceæ*.

HYDROPHYLLIA, n. plu. *hī'drō-fĭl'lĭ-ă* [Gr. *hudra*, a water-snake; *phullon*, a leaf]: in *zool.*, overlapping appendages or plates which protect the polypites in some of the oceanic Hydrozoa; also termed 'bracts.'

HYDROPHYTE, n. *hĭ'drō-fīt* [Gr. *hudōr*, water; *phŭtŏn*, a plant]: a plant which lives and grows in water.

HYDROPNEUMATIC, a. *hī'drō-nū-măt'ĭk* [Gr. *hudōr*, water; *pneuma*, breath, spirit]: applied to the water-trough used in collecting gases, etc.

HYDROPSY, n. *hĭ'drŏp-sĭ* [Gr. *hudrōps*, the dropsy; *hudrōpĭkŏs*, relating to dropsy—from *hudōr*, water]: dropsy—*dropsy* being but a contraction of *hydropsy*. **Hydrop'ic**, a. *-drŏp'ĭk*, or **Hydrop'ical**, a. *-ĭ-kăl*, resembling dropsy; dropsical: see Dropsy.

HYDROPULT, n. *hī′drō-pŭlt* [Gr. *hudōr*, water; *pallō*, I hurl or toss (see CATAPULT)]: a garden implement for watering flowers.

HYDRORHIZA, n. *hī′drō-rī′ză* [Gr. *hudra*, a water-snake; *rhiza*, a root]: in *zool.*, the adherent base or proximal extremity of any hydrozoon.

HYDRO-SALTS, n. plu. *hī′drō-sawlts* [Gr. *hudōr*, water]: salts, the acid or base of which contains hydrogen.

HYDROSCOPE, n. *hī′drō-skōp* [Gr. *hudōr*, water; *skŏpĕō*, I view]: an instrument for measuring the dampness or moisture of the air, or of any other gas.

HYDROSOMA, n. *hī′drō-sō′mă* [Gr. *hudra*, a water-snake; *sōmă*, body]: in *zool.*, the entire organism of any hydrozoon.

HYDROSTATICS, n. plu. *hī′drō-stăt′ĭks* [Gr. *hudōr*, water; *stătikos*, standing or settling]: the science which treats of the properties of fluids when at rest—namely, their weight, pressure, and equilibrium, particularly of water. HY′DROSTAT, n., general term, signifying an apparatus or contrivance to prevent the explosion of steam-boilers. HY′DROSTAT′IC, a. *-ĭk*, or HY′DROSTAT′ICAL, a *-ĭ-kăl*, of or relating to the properties of water while at rest. HY′DROSTAT′ICALLY, ad. *-ĭ-kăl-lĭ*. HYDROSTATIC BALANCE, a balance employed to weigh bodies in water in order to determine their specific gravity. HYDROSTATI′CIAN, *-sta-tĭ′shŭn*, one versed or skilled in hydrostatics.

HYDROSTATICS, *hī-drō-stăt′ĭks:* science which treats of the weight and equilibrium of liquids, and of their pressure on the walls of vessels containing them. The science depends on the way in which the molecules of a liquid form a mass under the action of gravity and molecular attraction, the latter of which is so modified in liquids as to give them their state of liquidity. Though the particles of a liquid cohere, they are free to slide upon one another without the least apparent friction; and it is this perfect *mobility* that gives them the mechanical properties considered in hydrostatics. The liquid usually under consideration is water, but the principles are of similar application to other liquids.

The fundamental property may be thus stated: WHEN A PRESSURE IS EXERTED ON ANY PART OF THE SURFACE OF A LIQUID, THAT PRESSURE IS TRANSMITTED UNDIMINISHED TO ALL PARTS OF THE MASS, AND IN ALL DIRECTIONS. Most of the other propositions of H. are only different forms or direct consequences of this truth. This is a physical axiom, but its truth may be experimentally proved. Suppose a close box B filled with water, and having a tube *a* inserted into the upper cover, of an inch in area, and with a plug or piston fitting into it. If the piston *a* is now pressed down on the water with a force equal to a pound weight, the water, being unable to escape, will react on the piston with the same force; but it obviously will not press more against *a* than against any other part of the box, therefore every sq. inch of the interior surface of the box is pressed outward with the force of a pound. If, then, there is another tube inserted in any part of the box with a plug of the same area, as at *b*, it will require a force of a pound to keep this plug in its place. (We leave out of account at present the pressure on *b* arising from the *weight* of the water in the box above it, and consider only the pressure propagated by the forcing down of the plug *a*.) However many plugs of the same size there were, each would be pressed out with the same force of a pound; and if there were a large plug of four times the area, as at *c*, it would be pressed out with a force of four pounds. We have only, then, to enlarge the area of the piston *c* to obtain any multiplication of the force exerted at *a*. If the area of *c* is 1,000 inches, that of *a* being one inch, a pressure of one pound on *a* becomes a pressure of 1,000 pounds on *c*; and if we make the pressure on *a* one ton, that on *c* will be 1,000 tons. This seemingly wonderful multiplication of power has received the name of the *hydrostatic paradox*. It is, however, nothing more than what takes place in the lever, when one pound on the long arm is made to balance 100 pounds on the short arm.

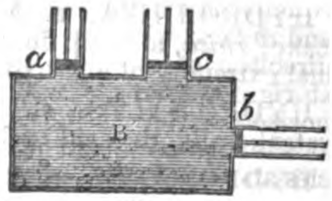


Fig. 1.

If the pressure which we have supposed exerted on the piston *a* arose from a pound of water poured into the tube above it, it would continue the same though the piston were removed. The pound of water in the tube is then pressing with its whole weight on every sq. inch of the inner surface of the box—downward, sidewise, and upward. The apparatus called the *hydrostatic bellows* acts on this principle (see fig. 2). It consists of two stout circular boards connected by leather in the manner of a bellows, B. The tube A is connected with the interior; and a person standing on the upper board, and pouring water into the tube, may lift himself up. If the area of the upper board is 1,000 times that of the tube, an ounce of water in the tube will support 1,000 ounces at W. It is on the same principle that the Hydraulic Press (q.v.) depends.

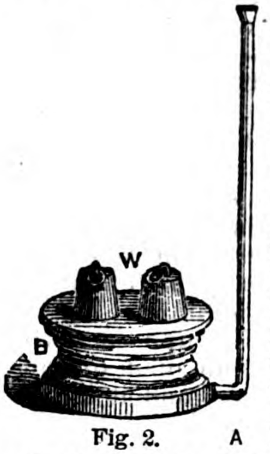


Fig. 2.

1. *Equilibrium of Liquids.*—After this explanation of the fundamental properties of liquids, it may be enough to state the two conditions of fluid equilibrium which directly flow from it. (1) Every molecule of the liquid must be solicited by equal and contrary pressures in every direction. This is a corollary from liquid mobility. (2) The upper molecules of a liquid, which are free, must form a surface perpendicular to the impressed force. The truth of this will sufficiently appear from the proof, that the sur-

face of a liquid at rest under gravity must be what is called horizontal. It can be shown to be a consequence of the primary property of 'pressing equally in all directions.' For let *da* and *cb* be vertical lines, or lines in the direction of gravity; and *ab* a plane at right angles to that direction, or horizontal. A particle of the liquid at *a* is pressed by the column of particles above it from *a* to *d*; and the like is the case at *b*. Now, since the liquid is at rest, these pressures must be equal; for if the pressure at *b*, for instance, were greater than at *a*, there would be a flow of the water from *a* toward *b*. It follows that the line *ad* is equal to *bc*, hence that *dc* is parallel to *ab*, therefore horizontal. The same might be proved of any two points in the surface; therefore the whole is in the same horizontal plane.

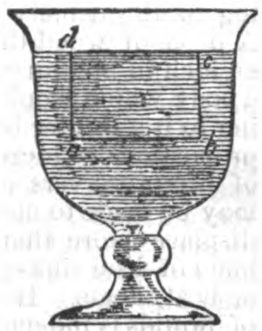


Fig. 3.

2. *Pressure of Liquids on Surfaces.*—The general proposition on this point may be stated thus: *The pressure of a liquid on any surface immersed in it, is equal to the weight of a column of the liquid whose base is the surface pressed, and whose height is the perpendicular depth of the centre of gravity of the surface below the surface of the liquid*: see article Centre of Pressure. The pressure thus exerted is independent of the shape or size of the vessel or cavity containing the liquid.

3. *Buoyancy and Flotation.*—As a consequence of the proposition regarding the pressure of liquids on surfaces, it can be shown that when a solid body is immersed in a liquid, it loses as much weight as that of an equal bulk of the liquid weighs. It follows that, if a cubic ft. of the liquid and of the solid have equal weights, the solid will lose all its weight, or will remain in the liquid wherever it is put; if a cubic ft. of the liquid weigh more than one of the solid, the solid will not only lose all its weight, but will rise up, and that with a force equal to the difference; if a cubic ft. of the liquid weigh less than one of the solid, the solid will lose weight, but will sink.

When a solid swims, or rises and *floats* on the surface of a liquid, the next problem of H. is to determine how much of it will be below the surface, We have already seen that any solid in a liquid is pressed upward with a force equal to the weight of the water whose room it occupies. Now, a floating body must be pressed up with a force equal to its own weight, otherwise it would sink lower; hence, *a floating body displaces its own weight of the liquid.* A solid, as AB in fig. 4, sinks until the space occupied by the part B immersed would contain an amount of water equal in weight to the whole solid AB.

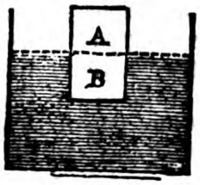


Fig. 4.

As the buoyancy of a body thus depends on the relation between its weight and the weight of an equal bulk of the liquid, the same body will be more or less buoyant, according to the density of the liquid, in which it is immersed. A piece of wood that sinks a ft. of water, will sink barely an inch in mercury. Mercury buoys up even iron. Also a body which would sink of itself, is buoyed up by attaching to it a lighter body; the bulk is thus increased without proportionally increasing the weight: this is the principle of life-preservers of all kinds. The heaviest substances may be made to float by shaping them so as to make them displace more than their own weight of water. A flat plate of iron sinks; the same plate made concave like a cup or boat, floats. It is to be noted that the buoyant property of liquids is independent of their depth or expanse, if there be only enough to surround the object. A few pounds of water might be made to bear up a body of a ton weight; a ship floats as high in a small dock as in the ocean.

4. *Stability of Floating Bodies.*—Conceive *abd* (fig. 5) to be a portion of a liquid turned solid, but unchanged in bulk; it will evidently remain at rest, as if it were still liquid. Its weight may be represented by the force *cg*, acting on its centre of gravity *c;* but that force is balanced by the upward pressure of the water on the different parts of the under surface; therefore, the resultant of all these elementary pressures must be a force, *cs*, exactly equal and opposite to *cg*, and acting on the same point *c*, for if it acted on any other point, the body would not be at rest. Now, whatever other body of the same size and shape we suppose substituted for the mass of solid water *abd*, the supporting pressure or buoyancy of the water around it must be the same; hence we conclude, that *when a body is immersed in a liquid, the buoyant pressure is a force equal to the weight of the liquid displaced, and having its point of application in the centre of gravity of the space from which the liquid is displaced.* This point may be called the *centre of buoyancy.*

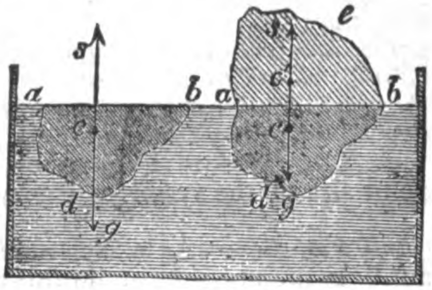


Fig. 5.

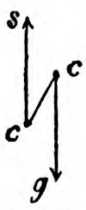


Fig. 6.

We may suppose that the space *abd* is occupied by the immersed part of a floating body *aebd* (fig. 5). The supporting force, *cb*, is still the same as in the former case, and acts at *c*, the centre of gravity of the displaced water; the weight of the body also must be the same; but its point of application is now c', the centre of gravity of the whole body. When the body is floating at rest or in a state of equilibrium, this point must evidently be in the same vertical line with c; for if the two forces were in the position of cs, $c'g$ (fig 6), they would tend to make the body roll over. The line passing through the centre of gravity of a floating body and the centre of gravity of the displaced water, is called the *axis of flotation*.

The equilibrium of a floating body is said to be *stable*, when, on suffering a slight displacement, it tends to regain its original position. The conditions of stability will be understood from the accompanying figures. Fig 7 represents a body floating in equilibrium, G being its centre of gravity, B its centre of buoyancy, and AGB the axis of flotation, which is of course vertical. In fig. 8 the same body is represented as pushed or drawn slightly from the perpendicular. The shape of the immersed portion being now altered, the centre of buoyancy is no longer in the axis of figure, but to one side, as at B. Now, it is evident, that if the line of direction of the upward pressure—that is, a vertical line through B—meets the axis above the centre of gravity, as at M, the tendency of the two forces is to bring the axis into its original position, and in that case, the equilibrium of the body is stable. But if BM meet the axis below G, the tendency is to bring the axis further and further from the vertical, until the body comes into some new position of equilibrium. There is still another case; the line of support or buoyancy may meet the axis in G, and then the two forces counteract one another, and the body remains in any position in which it is put; this is called *indifferent* equilibrium. In a floating cylinder of wood, for instance, B is always right under G, in whatever way the cylinder is turned. When the angles through which a floating body is made to roll are small, the point M is nearly constant. It is called the *metacentre;* and its position may be calculated for a body of given weight and dimensions. In the construction and lading of ships, it is an object to have the centre of gravity as low as possible, in order that it may be always below the metacentre. With this view, heavy materials, in the shape of ballast, are placed in the bottom, and the heaviest portions of the cargo are stowed low in the hold. See **Specific Gravity: Areometer.**

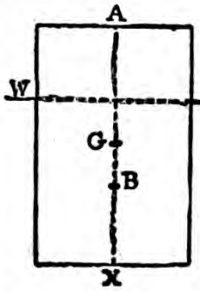


Fig. 7.

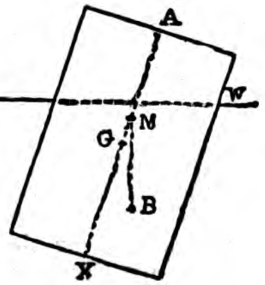


Fig. 8.

HYDROSULPHURET, n. *hī'drō-sŭl'fū-rĕt* [Eng. *hydrogen*, and *sulphur*]: a compound of hydrosulphuric acid with a base. **Hy'drosulphu'ric**, a. *-fū'rĭk*, pertaining to or derived from hydrogen and sulphur.

HYDROSULPHURIC ACID, *hī-drō-sŭl-fū'rĭk* (H_2S), known also as *Sulphuretted Hydrogen, Sulphydric Acid*, and *Hydrothionic Acid:* a natural gaseous constituent of many mineral waters—e.g., those of Aix-la-Chapelle in Germany, Barèges in France, Abano in Italy, and Harrowgate in England—and is evolved from fumaroles and volcanoes. It is formed spontaneously wherever sulphurous organic matters are undergoing putrefaction, e.g., in stagnant sewers and cesspools, and in waters charged with organic matter and sulphates, especially sulphate of lime.

There are several ways of preparing this gas, which is extensively used in laboratory operations. The following is most common. Sulphide of iron, in small fragments, is placed in a bottle, and dilute sulphuric acid is added. Water is decomposed, its hydrogen combining with the sulphur of the sulphide to form H. A., which escapes as a gas, while its oxygen enters into combination with the iron, forming oxide of iron (FeO), which unites with the sulphuric acid to form the ordinary protosulphate of iron or green vitriol, which remains in solution. The reaction is expressed by the equation:

$$\overset{\text{Sulphide of Iron.}}{FeS} + \overset{\text{Sulphuric Acid.}}{H_2SO_4} = \overset{\text{Hydrosulphuric Acid.}}{H_2S} + \overset{\text{Sulphate of Iron.}}{FeSO_4}$$

H. A. is a colorless gas, of strong and very nauseous odor, resembling that of rotten eggs. It consists of two volumes of hydrogen and one volume of sulphur vapor condensed into two volumes, which form its combining measure. It is about 17 times heavier than hydrogen. By pressure it is liquefied, and by the additional application of cold it may be obtained in the solid form (see Gases). Water dissolves 3·23 volumes of this gas, but the solution soon becomes milky when exposed to the air, in consequence of the oxygen of the air combining with the hydrogen of the gas, and sulphur being precipitated. It is highly combustible, and burns with a pale, blue flame, producing water and sulphuric acid, and, generally, a deposit of sulphur. It has a weak acid reaction, and forms one of the hydracids. Although a feeble acid, it combines readily with bases.

Its use as a reagent is dependent on the fact that many of the sulphides which it forms with metallic oxides are insoluble in water, and are thrown down from solutions as precipitates with characteristic colors. Thus the gas, or a watery solution of it, gives an orange precipitate with the compounds of antimony—while with those of arsenic it gives yellow—with those of lead and of silver, black—and with those of zinc, white precipitates.

The air of a room slightly impregnated with this gas may be breathed with impunity, but a small quantity of the undiluted gas inspired produces faintness, and its respiration, in a very moderate proportion, was found by

Thenard to prove fatal—birds perishing in air which contained $\frac{1}{1500}$, and a dog in the air containing $\frac{1}{800}$ part of this gas. Its poisonous effects are best counteracted by the inhalation of very diluted chlorine gas, which may be readily obtained from a little chloride of lime placed in the folds of a napkin moistened with vinegar.

A very minute trace of this gas may be detected by placing a piece of paper, moistened with a strong solution of sugar of lead, over the vessel or aperture—as, for instance, over an opening in a drain—from which we think it is escaping. If it be present, a more or less black—often only a brown—tint is developed after a few minutes, in consequence of the formation of sulphide of lead.

HYDROTHECA, n. plu. *hī'drō-thē'kă* [Gr. *hudra*, a water-snake; *thēkē*, a chest]: in *zool.*, the little chitinous cups in which the polypites of many Hydrozoa are protected.

HYDROTHERMAL, a. *hī'drō-thėr'măl* [Gr. *hudōr*, water; *thermē*, heat]: of or pertaining to hot water—applied to the action of heated waters in dissolving, redepositing, and otherwise producing mineral changes within the crust of the globe.

HYDROTHORAX, n. *hī'drō-thō-răks* [Gr. *hudōr*, water; *thorax*, the chest]: dropsical collection in the pleura (q.v.), a closed serous sac enveloping the lung on either side. When it exists to any extent, the pressure which it exerts on the lungs impedes the passage of the blood through them, and occasions difficulty of breathing, lividity of countenance, etc.; and more or less dropsy in the face, ankles, etc., soon appears. The physical signs by which the disease can be detected are too purely professional for these pages.

The causes of H. are various. It may depend on inflammation of the secreting membrane, or it may be a consequence of organic disease of the heart or lungs. With regard to treatment when the disease seems to depend on inflammation of the pleura, great advantage may often be derived from occasional cupping and repeated blistering. The most popular internal remedy is a combination of squill and either calomel or blue pill, which must be continued till slight symptoms of salivation manifest themselves.

HYDROUS, a. *hī'drŭs* [Gr. *hudōr*, water]: containing water. HY'DRURET, n. *-drŏ-rĕt*, a compound of hydrogen, chiefly with a metal.

HYDROXYL, n. *hī-drŏks'ĭl* [*hydro*, and *oxygen*]: a univalent radical, consisting of one atom of hydrogen and one of oxygen.

HYDROZOA, n. plu. *hī'drō-zō'ă* [Gr. *hudra*, a water-serpent; *zōŏn*, an animal]: in *zool.*, gelatinous polyps organized like the hydra; the class of the Cœlenterata comprising animals constructed like the hydra: see HYDRA: ZOOPHYTES.

HYDRUN'TUM: see OTRANTO.

HYDRURIA, n. *hī-drô'rĭ-ă* [Gr. *hudōr*, water; *ouron*, urine]: an excessive secretion of limpid, watery urine.

HYEMAL, a. *hī-ē'măl* [L. *hĭĕmālĭs*, wintry—from *hĭems*, winter: F. *hyémal*]: belonging to or done in winter. **Hy'ema'tion**, n. *-mā'shŭn*, the passing or spending of winter in a particular place.

HYEN, n. *hī'ĕn:* OE. for Hyena, which see.

HYENA, or **Hyæna**, n. *hī-ē'nă* [L. *hyæna*, a hyena: Gr. *huaina*, a hyena—from Gr. *hŭs*, a sow]: genus of digitigrade, carnivorous quadrupeds, included in the genus *Canis* by Linnæus, and by some naturalists referred to the family *Canidæ*, but now more generally to *Viverridæ*, while the dentition connects it even with *Felidæ*. Hyenas have six incisors and two canine teeth in each jaw, five molars on each side in the upper jaw, and four in the under. They seize an object with so firm a hold, that, among the Arabs, they are proverbial for obstinacy. The vertebræ of the neck sometimes become anchylosed in old hyenas. The hind-quarters are lower and weaker than the fore-quarters of the body, so that hyenas move with a shambling gait. The body is covered with rather long coarse hair, forming a mane along the neck and back. The feet have each four toes. The claws are strong, fit for digging, and not retractile. The tail is rather short. Beneath the anus is a deep glandular pouch, contributing much to the offensive odor by which hyenas are characterized. Hyenas eat carrion as well as newly-killed prey, and are of much use, like vultures, as scavengers, clearing away the last remnants of carcasses that if left to rot would pollute the air. They sometimes attack cattle, especially if they flee, but rarely man, though they sometimes seize children. During the day they hide themselves in caves, old rock tombs, ruined edifices, etc.; by night, they roam singly or in packs in quest of prey. They prowl about towns and villages, and often dig up corpses that have not been very deeply buried. This, together with their aspect and manners, has caused them to be generally regarded with horror, and very exaggerated accounts of their fierceness have been prevalent.

Spotted Hyena (*H. crocuta*).

Instead of being untamable, as was long the popular belief, they are capable of being completely tamed, and show an attachment to man similar to that of the dog; they have even been used as watch-dogs. Hyenas are found only in Africa and s. Asia, not extending to the furthest east of the latter continent. The **Striped** H. (*H. vulgaris* or *striata*) is found both in Asia and in Africa, and there are several varieties considerably different in size, color, etc. The smallest hyenas are of the size of a large dog.—The **Spotted** H. (*H. crocuta*) inhabits s. Africa. It is rather smaller than the largest varieties of the Striped H., but more fierce and dangerous. It is called **Tiger-wolf** by the colonists of the Cape of Good Hope. Besides its ordinary howling, which it emits very freely in its nocturnal roamings, this H. often indulges in an expression of gratification or of some passion, resembling hysterical laughter, whence it has acquired the name **Laughing Hyena**. The general color is ochry gray, with thinly scattered small round brown spots, and sooty muzzle and feet.—The **Wooly** H. (*H. villosa*) is a smaller s. African species.

In consequence of the bones which hyenas eat, their dung forms solid yellowish-white balls, of compact earthy fracture, the *Album græcum* of the old materia medica.

HYERES, or **Hieres**, *ē-ār':* small town of France, dept. of Var, 3 m. from the Mediterranean, 8 m. e. of Toulon. Pop. abt. 7,000. It is celebrated for the beauty of situation and mildness of climate, and is much resorted to by foreigners suffering from chest or nervous complaints.—Near the coast lie the Iles d'Hières, called by the ancients the Stœchades, which, with the exception of the military garrisons of a few forts, are uninhabited. Here, the heat of the climate is tempered by the sea-breezes, and the season seems a perpetual spring.

HYETAL, a. *hī'ĕt-al* [Gr. *huetos*, rain]: in *meteor.*, of or belonging to rain; relating to the rainfall of different countries. **Hyet'ograph**, n. *-o-grăf* [Gr. *graphō*, I write]: chart indicating the comparative distribution of rain over a given geographical surface. **Hyetography**, n. *hī'ĕ-tŏg'ră-fĭ* the science of rain; the study of the quantities and localities in which rain has fallen in a given time. **Hy'etograph'ic**, a. *-tō-grăf'ĭk*, of or pertaining to the science of rain.

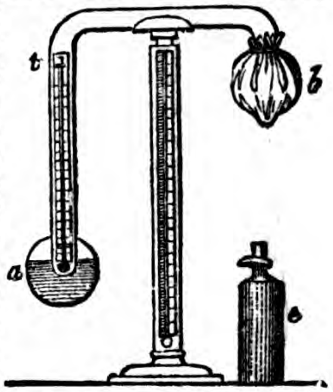
HYGEIA, n. *hī-jē'ă* [L. or Gr.]: in *anc. myth.*, the goddess of Health—daughter of Æsculapius. She was worshipped at Athens, Corinth, Argos, and othor important cities, and in works of art is usually represented as a blooming virgin, with a snake, the symbol of health, which drinks from a cup held in her hand.—**Hygeia** is the

Hygeia.

name of one of the planetoids (q.v.), discovered 1849. **Hygei'an**, a. *-jē'ăn*, relating to Hygeia; pertaining to health. **Hygiene**, n. *hī'jēn*, or *hī'jĭ-ēn*, health, the science or art of its preservation (see Health: Sanitary Science). **Hygienic**, a. *hī'jĭ-ĕn'ĭk*, of or relating to health or hygiene. **Hygieist**, n. *hī'jē-ĭst*, one who practices hygiene.

HYGROLOGY, n. *hī-grŏl'ŏ-jĭ* [Gr. *hugros*, wet, moist; *logos*, discourse]: doctrine of the phenomena and causes of the moisture of the atmosphere. **Hygrom'eter**, n. *-grŏm'ĕ-tėr* [Gr. *metron*, a measure]: instrument for measuring the degree of moisture in the atmosphere. **Hygrom'etry**, n. *-ĕ-trĭ*, the art of measuring the moisture of the atmosphere; the science that treats of the measurement of moisture in bodies, particularly of the atmosphere. **Hy'gromet'ric**, a. *-grō-mĕt'rĭk*, or **Hy'gromet'rical**, a. *-rĭ-kăl*, of or relating to hygrometry.

HYGROMETER, *hī-grŏm'ĕ-tėr:* instrument for measuring the quantity of moisture in the atmosphere. The earlier forms of H. depended on the property possessed by some substances of readily absorbing moisture from the air, and being thereby changed in dimensions or in weight. Of this kind was the hair H. of Saussure, in which a hair, which expands and contracts in length according as the air is more or less moist, was made to move an index; a similar instrument was the whalebone H. of Deluc; but as other causes as well as moisture affect such instruments, they afford no accurate indications. The most perfect H., theoretically, is that of J. F. Daniell (q.v.). It consists of two bulbs connected by a bent tube, as represented in the figure, and inclosing a thermometer, together with some ether and vapor of ether, the air having been expelled. The bulb, *b*, is covered with muslin, and *a* is either blackened or coated with metal. The observer's hand is placed for a short time on *b*, to drive the ether into *a*, leaving *b* and the tube filled with vapor of ether. A little ether is then dropped from a flask, of the form *e*, on the muslin-covered bulb; evaporation instantly takes place, and produces a cooling of *b*, which condenses the vapor inside; a fresh evaporation from *a* fills the vacuum, which is again condensed by dropping ether on *b*, and the process is repeated till the temperature of *a* is so reduced by successive evaporations (see Evaporation), that *dew* begins to be formed on the outside of the bulb. At the instant when this occurs, the height of the mercury in the two thermometers is accurately noted, the one giving the dew-point temperature, and the other the temperature of the air. The actual quantity of moisture contained in a cubic ft. of air can now be readily found from the following empirical



formula: weight of moisture in grains $= \frac{5656{\cdot}2}{448+t} \times p$; where t is the temperature of the air at the time of observation, and p (found from tables) the elasticity of vapor at the temperature of the dew-point. The evident defects of this instrument are, first, its rapidity of operation, so that no time is allowed for the glass, ether, and thermometer to come to the same temperature, and, in consequence, the dew-point is given higher than it actually is; secondly, its costliness, owing to the great consumption of ether; and, thirdly, its uselessness in tropical countries, owing to the difficulty of preserving the ether in a fluid state. Daniell's H. was used at the Royal Observatory, Greenwich, from 1840—the commencement of meteorological observations—till 1847, when it was superseded by the more convenient instrument, the WET AND DRY BULB THERMOMETERS. This instrument consists of two ordinary thermometers—one has its bulb bare, and then shows the temperature of the air; the other has its bulb covered with muslin which is kept wet by a cotton wick dipping into water. The evaporation from the muslin, and consequent cooling of the bulb, being in proportion to the dryness of the air, the difference between the readings of the two thermometers is greatest when the air is driest, and zero when it is completely saturated. The readings of the thermometers being taken, the elastic force of vapor at the dew-point is calculated by the formula of Dr. Apjohn (*Proceedings of the Royal Irish Acad.* 1840):

$$(1)\ \mathrm{F} = f - \frac{d}{88} \cdot \frac{h}{30}; \quad (2)\ \mathrm{F} = f - \frac{d}{96} \cdot \frac{h}{30};$$

the first formula to be used when the wet thermometer it above, and the second when it is below, the freezing-point (32°). In these formulæ, F is the elastic force of vapor at the dew-point, which has been determined for different temperatures by Regnault from carefully conducted experiments; f, the elastic force at the temperature of evaporation (or reading of wet bulb); d, the difference between the dry and wet bulbs; and h, the height of the barometer. From this the quantity of moisture in a cubic ft. of air, etc., can be found as above. To dispense with these troublesome calculations, Glaisher's *Hygrometric Tables* may be used.

HYGROSCOPE, n. *hī'grō-skōp* [Gr. *hugros*, wet, moist; *skŏpĕō*, I see or view]: an instrument to show the moisture or dryness of the air. HY'GROSCOP'IC, a. *-skŏp'ĭc*, pertaining to the hygroscope; applied to moisture not readily apparent, but capable of detection by the hygroscope; having affinity to water.

HYGROSTATICS, n. plu. *hī'grō-stăt'ĭks* [Gr. *hugros*, moist; *stătĭkŏs*, standing or settling]: the science of comparing relative degrees of moisture.

HYKSOS, *hĭk'sos*, or HYKSHOS, *hĭk'shos* [Egyptian, *hyk*, ruler (or, as some say, captive), and *shos*, shepherd]: Egyptian dynasty, generally known as the Shepherd Kings. According to Josephus and Africanus, they consisted of

six or eight kings, named (1), Salatis, Silitis, or Saites, who reigned 19 or 15 years; (2), Beon, Banon, or Bnon, who reigned 43 or 44 years; (3), Apachnas, Apachnan, or Pachnas, who reigned 36 or 61 years; (4), Apophis, Aphosis, who reigned 61 years; (5), Anas, or Anan, who reigned 50 years; (6), Archles, who reigned 49 years; (7), Assis, or Asseth, who reigned 49 years and 2 months; (8), Apobis, who reigned 61 years. The greatest discrepancy exists in the names and their arrangement, and as to the total number of years of the dynasty. Manetho, according to Josephus, states that they reigned 511 years, but the total of the reigns he cites amounts to only 259 years 10 months; while Africanus makes their duration 284 years, and Eusebius 103. Africanus makes the Shepherds consist of the 15th, 16th, and 17th dynasties, and to have ruled 953 years, but gives the names and reigns of only one, which he calls the 15th; while Eusebius makes them more correctly the 17th dynasty. They are stated in the Egyptian annals to have been a race of conquerors from the East, who, under Salatis, their first king, took Memphis, and rendered tributary the whole of Egypt, and fortified the city of Avaris, on the e. of the Bubastite arm of the Nile, where he maintained a garrison of 240,000 soldiers. Their oppression, however, drove the Egyptians to revolt, and under Taakan, predecessor of Aahmes or Amasis I. of the 18th dynasty, a religious quarrel about the temples of Ra or the sun, and of Set, the god of the H., seems to have commenced, when a long war broke out, which ended under Aahmes, with the siege of Avaris; and a king called Misphragmuthosis, supposed to be a Thothmes, finally drove them out. The monument of an officer, named Aahmes-Penneben, at El Kab, recounts this siege and his exploits. Finally, according to Manetho, they departed under treaty. The great interest attaching to the H. is that, by the old ecclesiastical writers, they were confounded with the Hebrews, or supposed to be the monarchs under whom Joseph entered Egypt. In the monuments and the papyrus of Turin, in which portions of their names occur in the list of the kings, they bear the full titles of monarchs, though the papyri state that there were no kings in Egypt at the time, and that Taakan himself was only a *hek*, or prince of the south. The H., on a contemporary inscription remaining at El Kab, are called *Mena*, or Shepherds. The H. were not the devastating conquerors described by the historian. They entered Egypt, it appears from the monuments, about the 14th Egyptian dynasty, and were content with inscribing their names and titles on the monuments of their predecessors, the name of Appapus having been found on a colossus of Sebakhetp III. of the 13th dynasty, and on that of a king of the 14th dynasty at San. Traces of that of Saites or Salatis have been found also at Tel-Mokdam or Cynopolis. The greatest divergence of opinion as to their race and origin has prevailed among authors. Josephus calls them Hebrews or Arabs; the Syncellus, Phœnician shepherds. They have been supposed also to be Idumæans, Ishmaelites, or Scythians. Their physiognomy indicates a Semitic origin, while their worship of Set connects them with the Khita, a people n. of Palestine, on the confines of Mesopotamia. The names of the kings show no foreign peculiarities; some are purely Egyptian. As regards the date of the H. dominion, the most conflicting opinions have prevailed among scholars. Bunsen makes their rule end B.C. 1639; Lepsius, B.C. 1842. Placing, however, the discovered date of Thothmes III., B.C. 1445, in his 16th year, the H. dominion must have ended about B.C. 1500.

Bunsen, *Egypt's Place;* Lepsius, *Königsbuch;* Boïkh, Manetho; De Verria in *Rev. Arch.*, IV.; Mariette in *Rev. Arch.*, III; Brugsch, *Histoire d'Egypte;* Rawlinson, *History of Ancient Egypt.*

HYLÆOSAURUS, n., *hī'lē-ō-saw-rŭs* [Gr. *hūlē*, wood, matter; *sauros*, a lizard]: in *geol.*, huge dinosaurian reptile, found in the Wealden strata of Kent and Sussex, England. Fragments of different individuals have been found sufficient to give an approximate notion of the affinities and great size of this reptile. The bones of the head have not yet been observed; its teeth were comparatively small, and close set; they indicate that it was a vegetable eater. The body was broader than high, and terminated in a long slender flexible tail; the limbs were relatively short; the skin was covered with scutes and tubercles; and a row of very large thin angular bony spines extended down the back, and formed a serrated dermal crest, like the horny spines of the modern iguana. It is supposed to have attained a length of 25 ft. The remains of only one species have been found; it has been named *H. Oweni.*

HYLISM, n. *hī'lĭzm* [Gr. *hūlē*, matter]: in *meta.*, the theory which regards matter as the original principle of evil, in opposition to the *good spirit.*

HYLONOMUS, n. *hī-lŏn'ō-mŭs* [Gr. *hūlē*, wood, matter; *nŏmŏs*, an abode]: in *geol.*, a small lacertian reptile found inclosed in fossil tree-trunks.

HYLOZOISM, n. *hī'lō-zō'ĭzm* [Gr. *hūlē*, wood, matter; *zōē*, life]: the doctrine which imputes life and divinity to matter or the world. HY'LOZO'IC, a. or HY'LOZO'ICAL, a. *-ĭk-ăl*, pertaining to or connected with. HY'LOZO'IST, n. *-zō'ĭst*, one who believes and teaches that every part of matter has a species of life or sensation. HY'LOTHE'ISM, n. *-thē'ĭzm* [Gr. *Thĕŏs*, God], or HY'LOISM, the doctrine which teaches that the world or matter is God; materialism. HY'LOTHE'IST, n. *-ĭst*, one who believes that matter is God.

HYMEN, n. *hī'mĕn*, also HYMENÆUS [L. *Hymen;* F. *Hymen*—from Gr. *Hūmēn*]: originally the bridal song among the ancient Greeks, sung by the companions of the bride as she went from her father's house to that of the bridegroom: thence in *anc. myth.*, the god of marriage. The god H. is mentioned first by Sappho. The legends concerning him are various; but he is generally said to be a son of Apollo and some one of the Muses, though often his parentage is referred to Bacchus and Venus. He is represented as a boy with wings and a garland, a bigger and graver Cupid, with a bridal-torch and a veil in his hands. *Hymen* is also the name given to the virginal membrane. Hy'mene'al, a. *-mĕn-ē'ăl,* pertaining to marriage: N. a marriage song; also Hy'mene'an, n. *-mĕn-ē'ăn.*

HYMENIUM, n. *hī-mē'nĭ-ŭm* [Gr. *hūmēn*, a membrane]: in *bot.*, that portion of the fructification of a fungus in which the sporules are situated, usually more or less a membranous expansion; the part which bears the fructification in agarics. Hymenial, a. *hī-mē'nī-ăl*, belonging to the hymenium. Hymenicolar, a. *hī'mē-nĭ-kō'lėr* [L. *colo,* I inhabit]: in *bot.*, inhabiting the hymenium.

HYMENOCARIS, n. *hī'mĕn-ŏk'ă-rĭs* [Gr. *hūmēn*, a membrane; *karis*, a shrimp]: in *geol.*, a small shrimp-like crustacean.

HYMENOGENY, n. *hī-mĕn-ŏj'ĕ-nĭ* [prefix *hymeno-;* Gr. *gennaō*, I produce]: in *physiol.*, production of membranes by the simple contact of two liquids, as albumen and fat, when the former gives a coating to the globules of the latter.

HYMENOLOGY, n. *hī-mĕn-ŏl'o-jĭ* [prefix *hymeno-;* Gr. *logos*, a discourse]: branch of anatomical science which treats of the membranes.

HYMENOMYCETES, n. *hī'mĕn-ō-mī-sē'tēz* [Gr. *hūmēn*, a membrane; *mukēs*, a mushroom]: a class or division of the fungi in which the fructifying surface is exposed, as in mushrooms and sap-balls.

HYMENOPHORUM, n. *hī'mĕn-ŏf'ŏ-rŭm* [Gr. *hūmēn*, a membrane; *phorĕō,* I bear]: in *bot.*, the structure which bears the hymenium.

HYMENOPTERA, n. plu. *hī'mĕn-ŏp'tėr-a*, also Hy'menop'ters, n. plu. *-tėrz* [Gr. *hūmēn*, a membrane; *ptĕrŏn*, a wing]: an order of insects having four membranous wings, as bees or wasps. Hy'menop'terous, a. *-tėr-ŭs*, pertaining to.—*Hymenoptera* comprise a very great number of species, estimated at about one-fourth of the whole class, and of which some, as ants and bees, are singularly interesting and important. They have the mouth furnished with mandibles for cutting and tearing, but the other parts of the mouth are adapted for suction, and are generally narrow and elongated, often united into a kind of proboscis, as in bees: see Bee. The antennæ are generally slender, but often exhibit differences in the sexes of the same species. The wings are four, the first pair larger than the second, the wings of the same side united in flight by little hooks. The wings, when at rest, are laid one over another horizontally over the body. The wings are entirely membranous, not reticulated as in the *Neuroptera*, but with comparatively few nervures, the arrangement of which is so constant in the whole order, that particular names have been given to them and to the spaces between them, and

Wing of Honey-Bee.

their diversities have been made use of in classification. The wings are wanting in the imperfectly developed females (*neuters*) of some. Besides the ordinary eyes, all the H. have three small simple (or *stemmatic*) eyes on the top of the head. The abdomen is generally united to the thorax by a slender pedicle. The abdomen of the females is generally furnished with an organ capable of being protruded. but for different purposes in different sections of the order, it being in some of the hymenopterous tribes an ovipositor or borer, and in others a sting. The H. in their perfect state generally feed on honey, but some of them prey on other insects, which are the food of the larvæ of a greater number; while the larvæ of some feed on various vegetable substances. The metamorphoses of the insects of this order are perfect; the larvæ are generally—though not in all the families—destitute of feet; the pupæ take no food. The H. are remarkable for the dilatation of the *tracheæ* or air-tubes into vesicles, and the general perfection of the respiratory system. The instincts, and even apparent intelligence, displayed by some—particularly the *social* kinds, which live in communities—have excited admiration from the earliest times.—The order is divided into two sections — *Terebrantia*, having an ovipositor; and *Aculeata*, having a poison reservoir and sting. To the former belong saw-flies, gall-flies, ichneumons, etc.; to the latter belong ants, bees, wasps, etc.

HYMENULUM, n. *hī-mĕn'ū-lŭm* [a dim. from Gr. *hūmēn*, a membrane]: in *bot.*, a shield containing asci.

HYMETTUS, *hī'mĕt-ŭs:* mountain in Attica, now called Trelo Vouni, s.e. of Athens; famous among the ancients for its honey and its marble. The honey still retains its reputation.

HYMN, n. *hĭm* [L. *hymnus;* Gr. *humnŏs*, a song in honor of the gods: F. *hymne*]: song or ode of praise or of prayer addressed to the divine honor, or relative to religious emotions or experience. The word in its strict acceptation supposes a certain metrical structure, or at least some kind of rhythmical cadence. The modern distinction between, psalms and hymns is arbitrary: see PSALMODY: PSALMS. 'Bede speaks of the whole book of Psalms as called *Liber Hymnorum*, by the universal consent of Hebrews, Greeks, and Latins.' the use of hymns dates from the earliest days of Christianity (Matt. xxvi. 30; Col. iii. 16; Acts xvi. 25; Jas. v. 13 I Cor. xiv. 15, 26). There are passages in the New Testament whose poetical and hymn-like structure in the Greek, with rhythm (and in one case rhyme) gives rise to the belief among oriental scholars that they are extracts from original hymns in use during the apostolic age. Of such passages—beside the Hymn of the Virgin Mary (*Magnificat*, Lk. i. 46–55) of Zacharias (*Benedictus*, Lk. i. 68–79), of Simeon *Nunc dimittis*, Lk. ii. 29–32), and the Hymn of the Angels (*Gloria in Excelsis*, Lk. ii. 14)—are Eph. v. 14; I Tim. iii. 16; vi. 15, 16; II Tim. ii. 11, 12; and the thanksgiving prayer of the assembly of disciples, Acts iv. 25–30. Also, there are exultant songs of praise in the

Revelation; see Rev. iv., v., vii., xi., xv., xix. Our information as to the hymns of the early ages and still more as to their authors, is extremely imperfect. *Te Deum* is variously ascribed to St. Ambrose, St. Hilary, to Abundius, and to a monk named Sissabul. To Prudentius, with greater certainty are assigned *Hymn of Holy Innocents, Salvete Flores Martyrum,* and *Ales Diei Nuntius.* (See MAGNIFICAT: GLORIA: TE DEUM). Even the names of many of the authors of the more modern hymns are involved in uncertainty; but some of the most esteemed hymns are known as the production of Sedulius, of Fortunatus, of Paul the Deacon, of St. Bernard, and St. Thomas. The number of hymn-writers in the modern languages is so great as to preclude enumeration here. The most complete modern collection of mediæval Latin hymns is Mone's *Hymni Latini Medii Ævi* (1856). V. to praise or worship in song. HYMNING, imp. *hĭm'ĭng:* N. the singing of hymns. HYMNED, pp. *hĭmd.* HYMNIC, a. *-nĭk,* relating to hymns. HYM'NAL, n. *-năl,* a collection of hymns for public worship. HYM'NIST, n. *-nĭst,* a composer of hymns. (This is a much more correct form than hymnologist, though that word, which really means 'one who writes or discourses about hymns,' is in more general use.) HYMNOL'OGY, n. *-nŏl'ŏ-jĭ* [Gr. *logos,* discourse]: a discourse on hymns; the system or arrangement of hymns.

HYOID, a. *hī'oyd* [Gr. *υ*, the Greek letter upsilon; *eidos,* likeness]: having the form of an arch or of the Greek letter *υ*: N. a bone situated between the root of the tongue and the larynx. HYOI'DES, n. plu. *-dēz.* HYOI'DEAL, a. *-dĕ-ăl,* connected with the hyoid bone. HYOGLOSSUS, n. *hī'ō-glŏs'sŭs* [G. *glōssa,* tongue]: a flat quadrate muscle, arising from the whole length of the great cornu of the hyoid bone, and inserted into the tongue.

HYOPOTAMUS, n. *hī'ō-pŏt'ă-mŭs* [Gr. *hus,* a hog; *pŏtămos,* a river]: in *geol.,* a non-ruminant and even-toed tertiary mammal.

HYOSCYAMUS, n. *hī'ŏs-sī'ă-mŭs* [L. *hyoscy'ămus;* Gr. *hŭŏsku'ămŏs,* henbane—from Gr. *hus,* a hog; *ku'ămŏs,* a bean]: henbane, a genus of poisonous plants, used in medicine, of the ord. *Solănācĕæ.* HY'OSCY'AMINE, n. *-mĭn,* a peculiar poisonous substance obtained from henbane; also HY'OSCYA'MIA, n. *-ā'mĭ-ă.* See HENBANE.

HYP, *hĭp,* and HYPO, *hī'pŏ* [Gr. *hūpŏ,* under]: a common prefix in scientific terms, signifying *under* or *beneath,* in reference to place or position; indicating *deficiency,* or *less than,* when applied to quality or composition; used in same sense as L. prefix *sub.*

HYPÆTHRAL, a. *hī-pē'thrăl* [Gr. *hupaithros,* in the open air—from *hupo,* under; *aither,* the clear sky]: in *arch.,* exposed to the open air; without a roof. HYPÆ'THRUM, n. *-thrŭm,* in *arch.,* that portion of the interior of a building which is not protected by a roof.

HYPALLAGE, n. *hī-păl'lă-jē* [Gr. *hupal'lăgē,* an exchange—from *hupo,* under; *allassō,* I change]: a figure of speech in which words are made to interchange their cases, tenses, or relations.

HYPANTHOCRINUS, n. *hī'păn-thŏk'rĭ-nŭs* [Gr. *hupan thĕō*, I begin to flower—from *hupo*, under; *anthos*, a flower]: in *geol.*, a genus of rose-encrinites, so called from the flower-like contour of their receptacles and bifurcating arms.

HYPANTHODIUM, n. *hī'păn-thō'dĭ-ŭm* [Gr. *hupo*, under; *anthos*, a flower]: a fleshy receptacle inclosing the flowers, as in the fig; the flat, expanded receptacle of the genus of plants *Dorstēnĭă*, bearing many flowers.

HYPAPOPHYSIS, n. *hī'pă-pŏf'ĭ-sĭs* [Gr. *hupo*, below; *apŏph'ŭsis*, a sprout or process]: in *anat.*, a process or protuberance of bone which descends from the lower part of the centrum or body of the vertebra.

HYPATIA, *hī-pā'shĭ-â:* astronomer and mathematician of Alexandria, and head of the Neo-Platonic school in that city; b. in the latter part of the fourth c. (370 according to Hoche); murdered 415; daughter of Theon of Alexandria, mathematician and philosopher. She was remarkable equally for her beauty, her wisdom, and her tragic fate. From her earliest youth she showed an amazing intelligence, in consequence of which, her father, one of the most erudite men of his time, resolved to give her genius a thoroughly philosophic culture. She succeeded her father in the chair of philosophy at Alexandria; and the fame of her lectures drew round her students from all parts of the East where the influence of Greek thought and knowledge was felt. H. seems to have been worthy of the lofty eulogies that she has received. Amid the widespread corruptions of Alexandria, she lived as spotless as a vestal; and though her teaching was not such that it could lay a strong hand on the frightful vices of heathenism, and arrest their course it at least indicates in her a love of beauty, truth, and goodness, that was Christian in its spirit though heathen in its form and limitations. Among her numerous pupils was Synesius, afterwards Bp. of Ptolemais, whose letters to her show his profound reverence. The citizens of Alexandria were proud of her; and such reliance was placed on her judgment and sagacity, that the magistrates used frequently to consult her on important cases. Among those who were most intimate with her was Orestes, prefect of the city. At this time, the Bp. of Alexandria was Cyril (q.v.), a fierce hater of heathens and heretics. Detesting Orestes, whom he suspected of being no true Christian, and who had drawn up an accusation against him for exciting a tumult, he soon cast an evil eye on H., whom he regarded as a Satanic enchantress, and the grand obstacle to his reconciliation with the prefect. His hatred communicated itself to the lower clergy, and especially to certain savage monks from the Nitrian deserts, who, headed by one Peter, a reader, attacked H. in the streets as she was returning from her lecture-room. The maiden was dragged from her chariot, hurried to the Cæsarian Church, where she was stripped naked, and murdered with tiles, after which she was torn to pieces, and her limbs carried to a place called Cinaron, and there burned to ashes.—Suidas records that H. was author of mathematical commentaries, and of an astronomical canon: her works have not been preserved. She is the heroine of Charles Kingsley's romance, *H., or New Foes with an Old Face.*

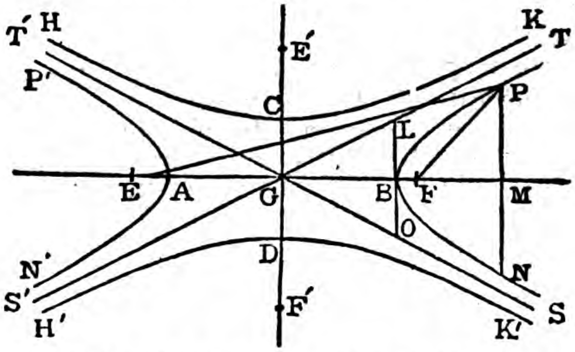
HYPER, *hī'pėr* [Gr. *hūper*, above]: a prefix signifying *above*, *over*, or *beyond*, in reference to place or position; indicating *excess* when applied to quality or composition; in *chem.*, applied to acids which contain the largest proportion of oxygen.

HYPERÆMIA, n. *hī'pėr-ē'mĭ-ă* [Gr. *huper*, over; *haima*, blood]: excessive supply or accumulation of blood. HY'PERÆ'MIC, a. *-ē'mĭk*, pertaining to; having an excessive supply of blood.

HYPERÆSTHESIA, n. *hī'pėr-ēz-thē'zhĭ ặ* [Gr. *huper*, above; *aisthēsĭs*, perception, sensation]: in *med.*, term including those affections which have this property in common—viz., exalted irritability and morbid sensibility of the nerves. H. of the cutaneous nerves is manifested by pain in its various modifications, sometimes intensely severe, as in Tic Douloureux (q.v.), while H. of the nerves of special sense is manifested by phantasms, illusions, etc. The following points are common to the whole class of these affections: 1. Periodicity, or the alternations of paroxysms and intermissions; 2. Uniformity and persistence of the symptoms, however long the duration of the disease; 3. No danger to life; 4. Freedom from this class of diseases in early life. Of the diseases predisposing to H. hysteria is far the most frequent; but it is sometimes induced by rheumatism, gout, skin-diseases, etc.

HYPERBATON, n. *hī-pėr'bă-tŏn* [Gr. *huper*, above or beyond; *bainō*, I go]: a figure of grammar in which the natural order or construction of a sentence is inverted. HY'PERBAT'IC, a. *-băt'ĭk*, transposed; inverted.

HYPERBOLA, n. *hī-pėr'bō-lă* [Gr. *huper*, over, beyond; *ballō*, I throw]: one of the conic sections or curves, formed by the section of a cone when the cutting-plane makes a greater angle with the base than the side of the cone makes. If two similar cones be placed apex to apex, and with the lines joining the apex and centre of base in each, in a straight line; then if a plane which does not pass through the apex be made to cut both cones, each of the two sections will be a *hyperbola*, as PBN, P'AN'. It is, viewed analytically, the locus of the point to which the straight lines EP, FP differing by a constant quantity are drawn from two given points, E and F. These given points are called the *foci*, one being situated in each hyperbola. The point G, midway between the two foci, is called the *centre*, and the line EF the *transverse axis* of the hyperbola. A line through G perpendicular to the transverse axis is called the *conjugate axis;* and a circle described from centre B, with a radius equal to FG, will cut the conjugate axis in C and D. If G be taken for the origin of co-ordinates, and EM and E′F′ for the axes, the hyperbola is expressed by the equation $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. (GB $= a$, GC $= b$). The hyperbola is the only conic section which has Asymptotes (q.v.); in the figure these are GT, GT′; GS, GS′. It also appears that if the axes of co-ordinates be turned at right angles to their former position, two additional curves, HCK, H′DK′, will be formed, whose equation is $\frac{x^2}{b^2} - \frac{y^2}{a^2} = 1$. These two are called *conjugate hyperbolas*, and have the same asymptotes as the original hyperbolas. These asymptotes have the following remarkable property: If (starting from G) the asymptotes be divided in continued proportion, and from the points of section lines be drawn parallel to the other asymptote, the areas contained by two adjacent parallels and the corresponding parts of the asymptote and curve are equal; also lines drawn from the centre to two adjacent points of section of the curve, enclose equal areas. The equation to the hyperbola when referred to the asymptotes is $xy = ab$; which shows that as the ordinates decrease in geometrical progression, the abscissæ increase in the same ratio. HYPER′BOLOID, n. *-bō-loyd* [Gr. *eidos*, appearance], a geometrical solid formed by the revolution of a hyperbola about its axis.



HYPERBOLE, n. *hī-pėr′bō-lē* [L. *hyper′bŏle;* Gr. *huper′-bŏlē*—from *huper*, over, beyond; *ballō*, I throw]: figure of rhetoric, by which expressions are employed that, taken literally, signify more than is really meant: the use of the figure is to arrest the attention, and it abounds in oriental writing. Hyperbole is the basis of many metaphors. Thus, Nero is called a ‘monster;’ Tamerlane, a ‘tiger;’ and so on. HY′PERBOL′IC, a. *-bŏl′ĭk*, also HY′PERBOL′ICAL, a. *-ĭ-kăl*, relating to or connected with the hyperbole; exaggerating much beyond the truth. HY′PERBOL′ICALLY, ad. *-kăl-lĭ.* HYPER′BOLISM, n. *-bō-lĭzm*, the use of hyperbole. HYPER′BOLIST, n. *-lĭst*, one who. HYPER′BOLIZE, v. *-bō-līz*, to speak or write with exaggeration; to exaggerate. HYPER′BOLI′ZING, imp.. HYPER′BOLIZED, pp. *-līzd.*

HYPERBOREAN, a *hī′pėr bō′rē-ăn* [Gr. *huper*, over or beyond; *borĕăs*, the north]: of or from the north; northern:

N. an inhabitant of the extreme north. **Hyperboreans,** n. pl. (dwellers beyond Boreas or the North Wind): name given by the ancients to all the unknown peoples of the West and North. The Greeks imagined the country n. of the Rhipæan (generally supposed to be the Ural) Mountains to be inhabited by the H., and their residence was gradually referred to more distant regions; but it was universally supposed that, as the favorites of Apollo, they enjoyed a terrestrial paradise, a bright sky, and a perpetual spring, a fruitful land, and everlasting youth and health.

HYPERCATALECTIC, a. *hī'pėr-kăt-ă-lĕk'tĭk* [Gr. *huper*, over or beyond; *kătălex'is*, termination]: in *L.* and *Gr. poetry*, a verse having a syllable or two beyond the just measure.

HYPERCATHARSIS, n. *hī'pėr-kă-thâr'sĭs* [Gr. *huper*, over or beyond; *kathai'rō*, I purge]: excessive purging of the bowels.

HYPERCRITIC, n. *hī'pėr-krĭt'ĭk* [Gr. *huper*, beyond; *krĭtĭkos*, critical: F. *hypercritique*]: one who is critical beyond measure or reason. **Hy'percrit'ic,** or **Hy'percrit'ical,** a. *-ĭ-kăl*, unfairly severe or critical. **Hy'percrit'ically,** ad. *-lĭ*. **Hy'percrit'icism,** n. *-ĭ-sĭzm*, excessive or ungenerous criticism.

HYPERDULIA, n. *hī'pėr-dū'lĭ-ă* [Gr. *huper*, over; *doulei'a*, slavery, servitude]: in the *R. Cath., Chh.*, a superior kind of devotion paid to the Virgin Mary as distinguished from the 'dulia' or worship offered to saints and angels.

HYPERDYNAMIC, a. *hī-pėr-dī-năm'ĭk* [prefix *hyper;* Eng. *dynamic*]: in *pathol.*, for the time being morbidly over-excitable, with the attendant symptom of undue strength, sure to be followed sooner or later by proportionate exhaustion and feebleness.

HYPERICACEÆ, *hī-pĕr-ĭ-kā'sē-ē*, or **Hyperici'næ,** *hī-pĕr-ĭ-sī'nē:* natural order of exogenous plants, containing about 300 known species, trees, shrubs, and herbaceous plants, widely distributed over the world, and in very different climates, but abundant particularly in N. America. The leaves are generally covered with pellucid dots, and the edges of the leaves, sepals, and petals bordered with black glands. The stamens are united at the base, and grouped in from 3 to 5 bundles.—The species of *Vismia* yield a substance resembling gamboge. Many of the H. belong to the genus *Hypericum*, or St. John's Wort, of which some species are common natives of Britain, adorning woods, heaths, etc., with their bright yellow flowers. *H. calycinum*, a spreading shrubby species, has flowers more than two inches in diameter. *H. perforatum*, the common or true St. John's Wort, has astringent properties, and is used for gargles and lotions, and internally in dysentery, etc., though not recognized in the pharmacopœia. Superstitious notions are connected with it in many parts of Europe, particularly when gathered on the day of St. John the Baptist—*H. Androsœmum* (or *Androsœmum* *officinale*), commonly called Tutsan, with berry-like fruit, was once in great esteem as a vulnerary. Its English name *Tutsan,* is from the French *tout saint,* all whole.

HYPERICUM, n. *hī-pĕr′ĭ-kŭm* [prefix *hyp-;* Gr. *ereikē,* heath, heather]: in *bot* , St. John's Wort; typical genus of *Hypericaceæ* (q. v.).

HYPERIDES, *hĭp-ĕ-rī′dēz* or *hī-pĕr′ĭ-dēz:* Athenian orator, one of the ten Attic orators: b. prob. abt. B.C. 390; put to death by Antipater shortly after B.C. 322. Till B.C. 324, H. supported Demosthenes; then opposed him. He had a subtle, graceful wit, and a rich vocabulary, and was a devotee of pleasure.

HYPERINOSIS, n. *hī′pėr-ĭ-nō′sĭs* [Gr. *huper*, beyond; *is,* a fibre, *inos,* of a fibre]: in *med.*, a condition characterized by an excessive formation of fibrine in the blood.

HYPERION, n. *hī-pē′rĭ-ŏn* [L. *Hypĕrīon;* Gr. *Hupĕrīōn*]: in *L.* and *Gr. myth.*, one of the Titans (q.v.), son of Uranus and Ge; Apollo, the god of day; a model of manly beauty.

HYPERMETER, n. *hī-pėr′mĕ-tėr* [Gr. *huper*, beyond; *mĕtron,* measure]: anything greater than the ordinary standard of measure; a line or verse of poetry containing a syllable more than the usual number. **HY′PERMET′RICAL**, a. *-rĭ-kăl,* having a syllable too much.

HYPERMYRIORAMA, *hī-per-mĭr-ĭ-o-râ′ma* [prefix *hyper;* Eng. *myriorama*]: exhibition of an innumerable number of views.

HYPERODAPEDON, n. *hī′pėr-ō-dăp′ĕ-dŏn* [Gr. *huper*, above, excess; *odous,* a tooth; *dapĕdon,* pavement]: a lacertilian reptile found in rocks of supposed triassic age, so named from the many pavement-like palatal teeth.

HYPEROSTOSIS, n. *hī′pėr-ŏs-tō′sĭs* [Gr. *huper*, over; *ostĕŏn*, a bone]: an unnatural growth or projection from a bone; same as 'exostosis.'

HYPERPLASIA, n. *hī′pėr-plā′zhĭ-ă* [Gr. *huper*, over; *plassō*, I form]: excessive multiplication of the elements of a part. **HY′PERPLAS′TIC**, a. *-plăs′tĭk,* of or pertaining to hyperplasia: see HETEROLOGOUS.

HYPERPYREXIA, n. *hī′pėr-pĭr-ĕks′ĭ-ă* [Gr. *huper*, over; Eng. *pyrexia*]: the temperature of any body when very high, or when over 106° Fahr.

HYPERSARCOSIS, n. *hī′pėr-sâr-kō′sĭs* [Gr. *huper*, beyond; *sarx,* or *sarka*, flesh]: the proud or fungous flesh of a wound: also **HYPERSARCO′MA**

HYPERSTHENE, n. *hī′pėrs-thēn* [Gr. *huper*, above or excess; *sthĕnŏs*, strength]: mineral closely related to augite and diallage. It is a bisilicate of iron and magnesia; crystalline, but often found granular or disseminated. Viewed in one direction, with reference to its cleavage planes, it is copper-colored, in another it is dark brown. When cut and polished, it is cherry-red, with a pearly lustre, and is valued for rings, brooches, etc. The finest specimens are brought from the coast of Labrador (H. was formerly confounded with hornblende, and called Labrador hornblende) though it is found in Norway, Sweden, Germany, Scotland, etc. It is found sometimes in connection with felspar, forming *Hypersthene rock*, a rare kind of trap rock.

HYPERSTHENIA, n. *hī'pėrs-thĕn'ĭ-ă* [Gr. *huper*, excess; *sthĕnŏs*, strength]: excessive energy of the organic powers amounting to disease. HY'PERSTHEN'IC, a. *-thĕn'ĭk*, of or belonging to.

HYPERTAUTOLOGY, n. *hī-pėr-taw-tŏl'o-jĭ* [prefix *hyper-;* Eng. *tautology* (q.v.).]: excessive tautology.

HYPERTHESIS, n. *hī-pĕr'thĕ-sĭs* [Gr. *huper*, above, over; *thesis*, a placing]: in *philol.*, transferring of a letter from the syllable to which it properly belongs to another syllable immediately preceding or succeeding, as *alumnia* for *alumina*.

HYPERTHYRION, n. *hī-pėr-thĭr'ĭon* [Gr. from *huper*, above, beyond; *thura*, a door]: in *arch.*, that part of the architrave which is over a door or window.

HYPERTROPHY, n. *hī-pėr'trō-fĭ* [Gr. *huper*, beyond; *trŏphē*, food, nourishment]: excessive growth of a part; an increase in size of the healthy structure of an organ. The best examples of this change are seen in the muscular system, where it may occur altogether independently of disease. The huge bosses of flesh that stand prominently forward in the arm of a blacksmith or of a pugilist, and in the leg of an opera-dancer, are illustrations of H., where the general health may be perfect. In double organs, such as the kidneys and lungs, if the organ on one side degenerates through disease, the organ on the opposite side is often found to enlarge, and carry on double work. In these cases, H. is an effect of disease, but is at the same time a resource of nature to preserve life.—There are, however, cases in which the H. has a hurtful instead of a conservative effect, e.g. H. of the thyroid gland, constituting the disease known as goitre or bronchocele, H. of the prostate gland, of the spleen, etc. The following are, according to Paget, the conditions which give rise to H.: 1. The increased exercise of a part in its healthy function; 2. An increased accumulation, in the blood, of the particular materials which a part appropriates in its nutrition or in secretion; 3. An increased afflux of healthy blood. In H. of the muscular tissue, the first and third of these conditions are present. In H. of the fatty tissue, constituting obesity, there is an excess of fat or of its chief elements in the blood. HYPER'TROPHIED, a. *-fĭd*, caused or effected by hypertrophy; excessively developed.

HYPERYTE, n. *hī'pėr-īt:* a dark-colored, granite-like rock, composed of serpentine and hypersthene.

HYPHA, n. *hī'fă*, HYPHÆ, n. plu. *hī'fē* [Gr. *hūphē*, weaving]: the long cellular filaments occurring in many cryptogams, which, matted together, form a mycelium. HYPHAL, a. *hī'făl*, pertaining to a filamentous tissue.

HYPH'ASIS: see SUTLEJ.

HYPHASMA, n. *hī-făz'mă* [Gr. *hūphē*, weaving]: in *bot*, a web-like thallus of agarics; the mycelium of certain fungi; same sense as 'hypha.'

HYPHEN, n. *hī'fĕn* [L. *hyphen*—from Gr. *hūphĕn*, under one, together—from *hupo*, under; *hen*, one]: a short line between syllables, or between the parts of a compound word. **Hy'phened**, a. *-fĕnd*, united by a hyphen.

HYPHOMYCETES, n. *hī'fō-mī-sē'tēz* [Gr. *hūphē*, a weaving, a texture; *mukēs*, a mushroom]: a class of the fungi, in which the vegetative part consists mostly of threads not woven into a mass, as the naked-seeded molds.

HYPINOSIS, n. *hī-pĭn-ō'sĭs* [prefix, *hyp-*; Gr. *is*, *inos*, strength, muscle, fibre]: in *pathol.*, a diminished amount of fibrin in the blood, an occasional attendant on anæmia.

HYPNÆI, n. *hĭp'nē-ī:* a large order, tribe, or family of pleurocarpous or lateral-fruited mosses, with nodding capsule on a long footstalk, the stems generally cylindrical, the leaves imbricated.

HYPNOSCOPE, *hĭp'no-skōp:* powerful magnet, devised for measurement of hypnotic sensitiveness. It is said that 30 per cent. of persons tested manifest effects in about two minutes. The correctness of the results obtained awaits verification.

HYPNOTIC, a. *hĭp-nŏt'ĭk* [Gr. *hupnos*, sleep]: tending to produce sleep: N. a medicine which produces sleep; a soporific. **Hypnology**, n. *hĭp-nŏl'o-jĭ* [Gr. *logos*, a discourse]: treatise or discourse on sleep and its phenomena; the study of the phenomena of sleep. **Hypnologist**, n. *-jĭst*, one versed in hypnology. **Hypnosis**, condition of a person who is in the peculiar sleep formerly called mesmeric. **Hyp'notize**, to bring into the peculiar sleep produced by hypnotism (q.v.).

HYPNOTISM, *hĭp'nō-tĭsm:* kind of sleep produced by a certain process in persons of peculiarly susceptible nervous organism; often called the mesmeric sleep. H. designates certain phenomena of the nervous system which in many respects resembles those loosely attributed to animal magnetism, but which clearly arise from the physical and psychical condition of the patient, and not from any emanation proceeding from others. From time immemorial, Egyptian conjurors and sorcerers have been accustomed to produce artificial somnambulism, usually by inducing their subject to gaze intently for a few minutes at certain cabalistic signs marked on the centre of a white plate. The Yogins, a Hindu sect, practice similar arts; the peculiar states of trance or ecstasy into which the Mount Athos monks and other religious fanatics were accustomed to throw themselves, are of kindred nature; and many allusions in the works of classical authors relate to phenomena more or less of this kind.

About the middle of the 17th c., while the phenomena of terrestrial magnetism were attracting considerable attention, one Valentine Greatrakes, in London, professed to cure diseases by stroking with the hand. A century later, Gassner, Swabian priest, employed a similar mode of treating disease which he ascribed to demoniacal possession. About 1774, Mesmer, a Viennese physician began to treat diseased organs by application of artificial magnets. The phenomena exhibited by his patients, especially the more nervous of them, led him to adopt the view that the magnets operated not as special sources of influence, but as conductors of a magnetic fluid which he could communicate at will to the patient, even at a distance. Four years later, he commenced practice in Paris with great success. His usual methods were to seat his patient with his back to the north, to press the pit of the stomach and make passes with his hands in front of his face, meanwhile fixing his patient's eye, and soothing him by the aid of music. Sometimes too he placed his patients in connection with 'magnetized' trees, or set them in a circle around a covered vessel from which he professed to conduct the invisible fluid, thus inducing peculiar nervous conditions. In 1785 a royal commission was appointed to examine Mesmer's pretensions. These investigators found that the same phenomena could be produced in Mesmer's more nervous patients when blindfolded, by merely inducing them to suppose themselves in the neighborhood of any of Mesmer's magnetic appliances, though none were really present; while conversely, magnets and magnetic tree were alike powerless, if the patient were kept unaware of their proximity. The Marquis de Puységur at the same time discovered that he could induce artificial somnambulism without the aid of magnets, by passes alone; but unfortunately for further investigation, the subject fell into the hands of the archquack, Cagliostro (q.v.), and thus became extremely discredited by physiologists. Despite the unfavorable report of the French Commission of 1785, as well as of a later one in 1831, and subsequent exposures, vague theories of magnetic influence, odylic force, new imponderable substance, electro-biology, or the like, were constantly recurring, since science had nothing with which to replace them, until the investigations of James Braid, Scottish surgeon in Manchester, England. In 1841 he went to a mesmeric séance, which seemed to him a mere triumph of imposture over credulity; but returning on another occasion to watch the details more narrowly, he was surprised to find that the patient was really unable to keep his eyes open. After some reflection, he concluded that by continuous staring, the eyes with their nerve centres became fatigued, and the balance of the nervous system was thus destroyed. Resorting to experiment, he at once succeeded in throwing his servant and others into thorough mesmeric sleep by simply inducing them to gaze intently for a few minutes at the mouth of a bottle placed above, but close to the eyes. He thus proved the absolute dependence of the mesmeric phenomena on the physiological condition of the patient, not on that of the operator; and found that he had thenceforth to deal with a new order of cerebral states, thereafter to be classed with those of sleep, somnambulism, and insanity. He therefore proposed the word hypnotism, which now so advantageously replaces the terms animal magnetism and mesmerism. Braid investigated the subject with great thoroughness and success for some years, and attempted the treatment of certain diseases by inducing hypnotism. Unfortunately, however, the evil reputation which the subject had obtained, prevented the due appreciation of Braid's discoveries, and it was not until about 1875 that the subject began to be thoroughly investigated by physiologists. Preyer and Heidenhain in Germany, and Richet in France, have confirmed aud extended Braid's results, of which a summary follows. It is to be premised that no scientific observer has ever confirmed the statements of mesmerists as to clairvoyance, reading of sealed letters, influence on unconscious persons at a distance, or the like; and, in cases as above stated, the influence of the mesmerizer is unnecessary, and in all cases unimportant.

The physiological changes which are set up are usually as follows: A spasm of the accommodating apparatus first takes place, the pupils meanwhile dilating, and the eyeballs being protruded, while the eyelids droop. Respiration and circulation become greatly accelerated, and perspiration frequently ensues. Finally, profound stupor may ensue. A very remarkable degree of insensibility to pain exists, so that even surgical operations may sometimes be performed as well as under chloroform. The reflex irritability of all the voluntary muscles is greatly increased (indeed for days after the experiment), so that stroking an area of skin produces a spasm of the subjacent muscles, which may even spread over the whole body, producing a perfectly cataleptic rigidity, so that Heidenhain indeed considers the hypnotic state as nothing more than an artificially produced catalepsy. These considerations indicate the danger of repeatedly subjecting the same person to hypnotic experiments, lest the abnormal state should be rendered permanent. Moreover, since in some persons the hypnotic state begins with general convulsions, the non-medical reader is warned against attempting to hypnotize.

During hypnotism, consciousness is diminished or dormant. The patient may, if only slightly affected, remember what has happened; if more fully hypnotized, he has no remembrance of his actions until hints are given; in the most complete state, he has no remembrance whatever. In hypnosis, however, sensory perceptions take place; but these are not converted into conscious ideas—in other words (as constantly happens in a 'brown study'), the sensation is present, but the power of directing the attention toward it is temporarily lost. Reflex action, however, goes on more freely in the absence of the inhibiting will; and thus movements made before a hypnotized person are perceived by the imperfectly closed eyes, and the stimulation of the organ of sense sets up a material change in the central nervous system, which liberates movements, apparently voluntary, yet not really so. Thus the patient may be induced to imitate every movement, however absurd or trivial, which is presented to him. The tendency to mimicry, so common, especially in children, monkeys, parrots, etc., is thus intensified, or rather the stimulus of the sensory impression is allowed to work unchecked.

As sometimes in ordinary sleep, but with ease and certainty, dreaming may be induced. Thus the medium may be conducted through all the stages of a journey, may be plunged into grief or raised to exuberant happiness by a few judicious suggestions. This state is nearly related to that of 'automatism at command,' where the medium obeys orders like a docile dog. Thus, as a crucial experiment, Heidenhain ordered his brother, a young medical student, to cut off his whiskers, the product of a year's assiduous cultivation, to the great vexation of the youth on awaking. So too, placing the body in a given position calls up the appropriate actions. A pillow, properly placed in the medium's arms, is nursed like a baby; music makes him dance; and so on. In all cases, the spoken command, the position of the limbs, or the sensory stimulus, sets up the impulse to the actions indicated, without either intelligence or volition being awakened. The patient never falls down, and the power of co-ordinating the movements of walking, etc., is nearly perfect; his attitudes have often an unusual grace, and in the lighter stages of hypnotism he may converse freely and even with unwonted intelligence and emotion, due, doubtless, partly to freedom from the restraint of a knowledge of the surroundings, partly to the concentration upon a single train of thought. Very sensitive patients may be hypnotized by monotonous sounds like the ticking of a watch, or even by expectant attention, when alone. Numerous other remarkable phenomena have been described. Thus, by gentle pressure on the neck of a patient, he can be induced to repeat words spoken in his presence, especially when the sounds are directed to a sensitive area just below the sternum. Automatism at command is greatly facilitated by imposition of the operator's hand on the patient's head. By passes on one side, catalepsy or paralysis of the opposite side only can sometimes be induced. Remarkable disturbances of the sensation of color may take place; and so on.

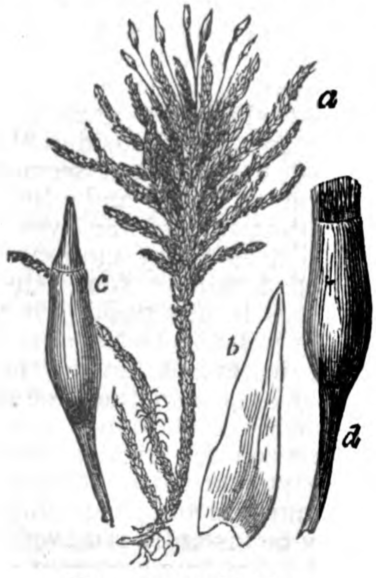
The state of the brain during hypnosis is not understood. The activity of the ganglion-cells of the cerebral cortex (with which the functions of consciousness are believed to be specially associated) appears to be inhibited by the gentle prolonged stimulation. The cerebral arteries are not contracted. Additional light is being obtained by experiments upon animals, of which many can be thrown into a state closely resembling, if not identical with the hypnotic.

The following are directions given by Braid for inducing the phenomena of H., especially the peculiar sleep-like condition. Take a silver lancet case or other bright object, and hold it between the fingers of the left hand, about 12 inches from the eyes of the person experimented on, in such a position above the forehead as to produce the greatest strain on the eyes compatible with a steady fixed stare at the object. The patient must be directed to rivet his mind on the object at which he is gazing. His pupils will first contract, but soon dilate considerably; and if, after they are well dilated, the first and second fingers of the operator's right hand, extended and a little separated, are carried from the object toward the eyes, the eyelids will probably close with a vibratory motion. After 10 or 15 seconds have elapsed, it will be found that the patient retains his arms and legs in any position in which the operator places them. It will also be found that all the special senses, excepting sight, are at first extremely exalted, as also are the muscular sense and the sensibility of heat and cold; but after a time the exaltation of function is followed by a state of depression far greater than the torpor of natural sleep. The patient is now throughly hypnotized. The rigidity of the muscles and the profound torpor of the nervous system may be instantly removed, and an opposite condition induced by directing a current of air against the muscles which it is wished to render limber, or the organ which it is wished to excite to action; and then by mere repose the senses will speedily regain their original condition. If a current of air directed against the face is not sufficient to arouse the patient, pressure and friction should be applied to the eyelids, and the arm or leg sharply struck with the open hand.

From the careful analysis of a large number of experiments, Braid was led to the conclusion, that by a continual fixation of the mental and visual eye upon an object, with absolute repose of body and general quietude, a feeling of stupor supervenes, which renders the patient liable to be readily affected in the manner already described. As the experiment succeeds with the blind, he considers that 'it is not so much the optic, as the sentient, motor, and sympathetic nerves, and the mind, through which the impression is made.'

Hypnotism is again coming into use in medical and surgical practice. Many of the minor operations of surgery have been performed on patients in the hypnotized state without pain, and hypnotism has been successfully employed as a therapeutic agent in numerous forms of disease, especially such as have their seat in the nervous system. Its facts have also very important bearings on the phenomena of reverie, trance, somnambulism, mania, religious excitement, spiritualism, etc. See Braid's *Magic, Animal Magnetism, etc.* (3d. ed., London 1852); Braid's *Hypnotic Therapeutics* (1853); Heidenhain's *Animal Magnetism* (London 1880); Hack Tuke's *Sleepwalking and Hypnotism* (1884). See Somnambulism, etc.

HYPNUM, *hĭp'nŭm:* genus of mosses, which contains many common species, growing on moist ground, in woods, on old trees, etc. Many species have stems of considerable length and much branched. The fruit-stalk springs from a lateral tubercle. The *peristome* (see Mosses) is double, the exterior of 16 teeth, the interior a membrane divided into 16 segments, with alternate cilia.



Hypnum dendroides:

***a*, plant about half natural size; *b*, leaf magnified; *c* and *d*, capsule magnified.**

HYPO, *hī'pō*, or Hyp, *hĭp* [Gr. *hūpŏ*, under]: a prefix signifving *under; beneath;* indicating *a less quantity;* implying *diminution*, or *inferiority*.

HYPOBLAST, n. *hī'pō-blăst* [Gr. *hupo*, under; *blastos*, a bud, a germ]: the under layer of the blastoderm; a fleshy body, or thick discoid, near the bottom of the dimple or hollow of the perisperm in the seed of the gramineæ. Hy'poblas'tic, a. *-blăs'tĭk*, of or pertaining to.

HYPOBOLE, n. *hī-pŏb'o-lē* [Gr. *hupo*, under; *ballō*, I throw]: in *rhet.*, a figure in which several things which seem to be opposed to the argument are mentioned, each of them being then refuted in turn.

HYPOCARPOGEAN, a. *hī'pō-kâr-pō'jē-ăn* [Gr. *hupo*, under; *karpos*, fruit; *gē*, the earth]: applied to plants producing their fruit below ground.

HYPOCAUST, n. *hí-pō-kawst* [Gr. *hupo*, under; *kaustos*, that may be burnt]: among the *Greeks* and *Romans*, an arched chamber in which a fire was kindled for the purpose of heating the baths or rooms, etc., above it; the fireplace of a stove. The smoke and heated air from the H. were made to circulate round the walls and under the floor of rooms above, through hollow tubes or a hollow lining. The full benefit of the fire was thus obtained, in place of a large portion of the heat being allowed to escape immediately through the chimney. The Romans invariably used this form of furnace for heating their dwelling-houses, and in all the Roman houses which have been discovered in Britain, remains have been found of the hypocaust. It is now coming again into use for heating the so-called 'Turkish Baths.'

HYPOCHÆRIS, *hī-pō-kē'rĭs:* genus of plants of nat. ord. *Compositæ*, sub-ord. *Cichoraceæ*, of which one species, *H. radicata*, or Long-rooted Cat's-ear, is common in meadows and pastures in some countries. Its leaves are all radical, and spread on the ground, resembling in form those of the dandelion, but rough; the stem is branched, the flowers not unlike those of the dandelion, but smaller. Cattle eat this plant readily, and its abundance is not deemed injurious to pasture or fodder.

HYPOCHILIUM, n. *hī'pō-kĭl'ĭ-ŭm* [Gr. *hupo*, under; *cheilos*, the lip]: in *bot.*, the lower part of the labellum of orchids.

HYPOCHLOROUS ACID, *hī-pō-klōr'ŭs* (HClO): dark red fluid, which, at a temperature of about 70°, becomes converted into an orange-colored gas, which very readily explodes into its ultimate constituents. A watery solution of this gas has a penetrating, chlorine-like odor, a caustic action on the tongue, colors the skin brown, and if applied for any length of time, causes it to ulcerate. It is the active ingredient of the different bleaching-powders and salts. Its salts—the hypochlorites—have much the same odor as the acid. Their solutions bleach organic pigments, such as litmus and indigo, and are used largely as bleaching agents.

HYPOCHONDERS, *hī-pō-kŏn'dėrz* [see HYPOCHONDRIUM]: the two lateral and superior regions of the abdomen (q.v.) under the cartilages of the false ribs, and to the right and left of the epigastrium.

HYPOCHONDRIASIS, *hī-pō-kŏn-drī'a-sĭs* [so called from its supposed connection with the hypocondriac regions of the abdomen]: disease characterized by extreme increase of sensibility, palpitations, morbid feelings that simulate a great variety of diseases, exaggerated uneasiness and anxiety, chiefly in what concerns the health, etc. In extreme cases it becomes a species of insanity (see below). The disease is intimately connected with, if not caused by, disorder of the digestive functions: see INDIGESTION.

Hypochondriacal Insanity.—When sombreness of disposition and anxiety concerning personal comfort become exaggerated, and attention is directed chiefly to the state of the health, it amounts to common hypochondriasis. When it passes beyond the control of the will, when the whole mind is directed to the state of the system, or to particular organs, and when it exalts and misinterprets sensations, the condition is designated hypochondriacal insanity. The disease may be described as the engrossment of the attention by false impressions conveyed, or conceived to be conveyed, from internal organs. Such sensations may, in many instances, be real, and proceed from actual alterations in the structure or functions of the parts supposed to be affected; but in this form of insanity, they consist of ordinary sensations, excited and intensified by the act of attention which makes them known to the patient. Neither the experience nor the sufferings of the victims are imaginary, however absurd their errors, and however groundless their apprehensions may be; the disease consists in the exaltation of sensibility and attention, and in the delusions which originate in that morbid state. A man lives in constant fear of death; he is firmly convinced that he labors under cancer, consumption, disease of the heart, or some other fearful disorder, and that he can live only with constant help of drugs; or that his stomach, or bowels, are contracted, or the abode of frogs, a fetus, or an army of soldiers; that his legs are transformed into glass or ice; that his whole body has assumed the shape of a teapot, or the magnitude of a hippopotamus. It is often a precursor of melancholia, as in the case of Cowper, the poet, and other kinds of alienation; but it must likewise be regarded as a distinct and independent affection, traceable, generally, to dyspepsia, or disorder of the digestive and assimilative apparatus. It is probable that shades and degrees of this malady may constitute the gradations between partially healthy and absolutely unsound minds. In women there are often added to the phenomena above described many of the symptoms of hysteria and great impressionability, and even convulsive affections; there is encountered likewise the simulation of diseases, the tendency to deceive others after having deceived themselves into the belief that they are invalids, and laboring under grievous and incurable disorders. They crave sympathy and support, as subject to affections of the spine, the joints, the lungs. They abstain from food, or devour inedible and disgusting substances; they writhe in what appears excruciating pain, and they voluntarily sustain great suffering during the treatment of their fancied ailments. A patient of one prominent physician underwent amputation of the finger, wrist, forearm, and ultimately of the arm, in order to be relieved of sores which she produced. Certain of the maladies which are pretended, or feared, or fancied, appear to be called into existence under the morbid influence of volition: and there are strong grounds for believing that the concentration of attention upon a particular function, not merely interferes with its exercise, but disturbs the physical condition, and leads to degeneration of the tissue of the organ with which it is connected by capillary congestion, or evolution of nerve-force.—Arnold on *Insanity* (1782); Bucknill and Tuke, *Psychological Medicine* (1874).

HYPOCHONDRIUM, n. *hĭp'ŏ-kŏn'drĭ-ŭm*, HYP'OCHON'DRIA, n. plu. *-drĭ-ă* [L. *hypochon'drĭă*—from Gr. *hupŏchŏn'drĭă*, the viscera that lie under the cartilage of the breastbone—from *hupo*, under; *chondros*, cartilage]: the part of the belly under the short ribs containing the liver and spleen; a disease characterized by uneasiness about the region of the stomach and liver. HYP'OCHONDRI'ASIS, n. *-drī'ă-sĭs*, a form of disease, amounting sometimes to insanity, characterized by morbid anxiety concerning the health (see below). HYP'OCHON'DRIAC, a. *-drĭ-ăk*, or HYP'OCHONDRI'ACAL, a. *-drī'ă-kăl*, affected by depression of spirits or melancholy. HYP'OCHON'DRIAC, n. one who is melancholy or disordered in imagination; a sufferer from hypochondriasis. HYP'OCHONDRI'ACALLY, ad. *-lĭ*. HYP'OCHONDRI'ACISM, n. *-sĭzm*, the disease hypochondriasis; melancholy; disordered imagination.

HYPOCOTYLEDONARY, a. *hī'pō-kŏt-ĭ-lē'dō-nér-ĭ* [Gr. *hupo*, under; Eng. *cotyledon*]: in *bot.*, applied to peculiar thickened roots whose structure it is often difficult to. determine, and which have the aspect of stems.

HYPOCRATERIFORM, a. *hī'pō-kră-tĕr'ĭ-fawrm* [Gr. *hupo*, under; *kratēr*, a cup; L. *forma*, shape]: in *bot.*, shaped like a saucer or salver.

HYPOCRISY, n. *hĭ-pŏk'rĭ-sĭ* [L. *hypoc'rĭsĭs*—from Gr. *hŭpŏk'rĭsis*, the action of a player personating another, dissimulation—from *hupo*, under; *krīnō*, I judge or discern]: a feigning to be what one is not, especially as regards religion; concealment of one's real character or motives. HYPOCRITE, n. *hĭp'ŏ-krĭt*, one who feigns to be what he is not; a dissembler. HYP'OCRIT'IC, a. *-ĭk*, or HYP'OCRIT'ICAL, a. *-ĭ-kăl*, assuming a false and deceitful appearance. HYP'OCRIT'ICALLY, ad. *-lĭ*.—SYN. of 'hypocrite': pretender; cheat; deceiver.

HYPODERMIC, a. *hī'pō-dėr'mĭk* [Gr. *hupo*, under; *derma*, the skin]: applied or inserted under the skin. HYPODERMA, n. *hī'pō-dėr'mă*, in *bot.*, the layers of tissue lying beneath the epidermis, and serving to strengthen it. HY'PODER'MAL, a. *-măl*, under the skin. HYPODERMIS, n. *hī'pō-dėr'mĭs*, in *bot.*, the inner layer of moss thecæ. HYPODERMIC INJECTION, method of introducing medicines into the subcutaneous cellular tissue by means of a very finely pointed syringe. (For the method formerly in use, see ENDERMIC). The science of medicine is indebted to Dr. Alexander Wood of Edinburgh for its invention. It is chiefly, but not solely, to anodynes that these methods are especially applicable. It has been found that morphia given by Dr. Wood's method acts more speedily and more powerfully than when given by the mouth: moreover, the medicine given in this way does not disturb the functions of the stomach, and may be administered in those cases of irritation of that organ in which medicines introduced into it would be rejected by vomiting. A solution of acetate of morphia, carefully freed from any excess of the acid, and of such strength that three minims shall contain one-third of a grain, is commonly employed, the dose varying from one to three minims, or from one-ninth to one-third of a grain of salt. If the general effects of the morphia (as relief of pain, and sleep) are required, any convenient part of the body, as, for instance, the fore-arm, may be selected: the skin, pinched up between the fore-finger and thumb of the left hand is penetrated by the point of the syringe, and the solution injected. When a local action is required, as in the case of various forms of neuralgia, the solution should be injected as near as possible to the seat of pain. As some patients are remarkably susceptible to the action of morphia administered in this method, physicians find it advisable to begin with the smallest of the above-named doses.

A scientific committee appointed by the Royal Medical and Chirurgical Soc. of London to investigate the physiological and therapeutical effects of the hypodermic method of injection, reported, 1867. Among the most important *physiological* facts observed, were the following: Watery solutions of drugs subcutaneously injected were far less rapid in their action than when they were introduced into a vein. On comparing the effects of medicines subcutaneously injected with those produced when they were administered by the mouth, or by injection into the lower bowel, it was found that in the case of some drugs, the local action was different according to the mode of administration, though the general effects produced were of the same kind. Thus, aconitine given by the mouth affected the salivary glands; when given by the rectum, it caused irritation of the gut; and when given by the skin, it occasioned local pain. The smallest dose fatal to rabbits was by the mouth $\frac{1}{60}$, by the rectum, $\frac{1}{50}$, and by the skin, $\frac{1}{300}$, of a grain: it was thus five times as energetic when given subcutaneously as when given in the most usual way. The effects of morphia when injected under the skin were also more rapidly manifested and more intense than when given by the mouth or rectum. A solution of podophyllin, which, when administered by the mouth, acts as a powerful cholagogue (bile-provoking) aperient, when injected into the skin, gives rise to free action of the kidneys. The investigations of the *therapeutic* value of this mode of administering drugs were limited by the fact that many substances (aconitine, for example) give rise to great local irritation when used subcutaneously. In cases of simple neuralgia, atropine was found to have a very beneficial effect when thus given, and in some cases more permanent relief followed its injection than that of morphia. The value of the latter drug was found to be much increased by this method, the required action being of longer duration, and being produced with greater rapidity and intensity. The same advantages followed this mode of giving quinine in intermittent fevers, but caution is requisite in giving large doses, as irritation may arise from its presence under the skin. Among the conclusions at which the committee arrives are the following: (1) That, as a general rule, only clear neutral solutions of drugs should be employed, decidedly acid or alkaline solutions being apt to cause irritation, and even local ulcers, at the point of application; (2) that, as in the case of podophyllin, symptoms are observed to follow the administration of some drugs by the skin, which are absent when the same drugs are otherwise administered; and (3) that the advantages to be derived from this method of introducing drugs are (*a*) rapidity of action, (*b*) intensity of effect, (*c*) economy of material, (*d*) certainty of action, (*e*) facility of introduction in certain cases, and (*f*) in some drugs, the avoidance of unpleasant symptoms. It ought to be understood that hypodermic injections, though often greatly beneficial at the hand of a careful physician, involve various dangers, either immediate or consequent, if resorted to by others.

HYPOGASTRIC, a. *hī'pō-găs'trĭk* [mid. L. *hypogas'-trĭcus*—from Gr. *hupo*, under; *gastēr*, the belly]: relating to the middle part of the lower region of the belly, called the HY'POGAS'TRIUM, n. *-trĭ-ŭm*.

HYPOGENE, a. *hī'pō-jēn* [Gr. *hupo*, under; *gennăō*, I produce]: term applied to the whole family of crystalline rocks, whether stratified or unstratified, plutonic or metamorphic, which have not assumed their present form and structure near the surface. Lyell proposed the term for use instead of the term *primary*, which he deemed inappropriate, because some granites are of more recent formation than some secondary rocks.

HYPOGEUM, n. *hī'pō-jē'ŭm* [Gr. *hupo*, under; *gē*, the earth]: the underground parts of a building. HY'POGE'A, n. plu. *-jē'ă*, subterranean structures hewn out of the rocks which abound along the Nile throughout the Libyan ridge of hills, and under the contiguous plains of sand. HY'POGE'OUS, a. *-ŭs*, and HY'POGE'AL, a. *-ăl*, under ground; subterranean; in *bot.*, applied to the parts of plants growing beneath the surface of the soil.

HYPOGLOSSAL, a. *hī'pō-glŏs'ăl* [Gr. *hupo*, under; *glossa*, the tongue]: pertaining to the ninth pair of nerves, situated beneath the tongue.

HYPOGYNOUS, a. *hī-pŏj'ĭ-nŭs* [Gr. *hupo*, under; *gŭnē*, a female]: in *bot.*, inserted below the ovary or pistil. HYPOGYN, n. *hī'pō jĭn*, a hypogynous plant.

HYPONASTY, n. *hī'pō-năs-tĭ* [Gr. *hupo*, under; *nastos*, pressed together, stuffed]: in *bot.*, a form of nutation when the organs grow most rapidly on the dorsal side.

HYPOPHLŒODAL, a. *hī'pō-flē'ŏ-dăl* [Gr. *hupo*, under; *phloios*, bark]: in *bot.*, existing beneath the epidermis of the bark.

HYPOPHOSPHITE, n. *hī'pō-fŏs'fīt* [Gr. *hupo*, indicating a *less quantity;* Eng. *phosphorus*]: compound of hypophosphorous acid with a base; a term generally applied to certain medicinal salts—chiefly the H. of soda, potash, lime, ammonia, and iron. HY'POPHOS'PHOROUS, a. *-fō-rŭs*, a name applied to an acid which contains less oxygen than phosphorous acid.

HYPOPHYLLOUS, a. *hī-pŏf'ĭl-lŭs* [Gr. *hupo*, under; *phullon*, a leaf]: in *bot.*, situated under the leaf.

HYPOPYUM, n. *hī-pō'pĭ-ŭm* [Gr. *hupo*, under; *puon*, pus]: in *pathol.*, collection of purulent matter in the anterior chamber of the eye; preceded by inflammation of the parts adjacent, if not also of all the tissues of the eye.

HYPOSPADIAS, n. *hī'pō-spā'dĭ-ăs* [Gr. *hupo*, under; *spădīzō*, I pull or tear off]: a malformation sometimes occurring in the under surface of the penis.

HYPOSPORANGIUM, n. *hī'pō-spō-rănj'ĭ-ŭm* [Gr. *hupo*, under; *spora*, seed; *anggos*, a vessel]: in *bot.*, the indusium of ferns growing from beneath the spore-case.

HYPOSTASIS, n. *hī-pŏs'tă-sĭs*, HYPOS'TASES, n. plu. *-sēz* [Gr. *hupo*, under; *stăsĭs*, a placing, a standing: L. *hypostăsĭs*]: distinct personality with joint dependence—applied to the Trinity; individual particular being; a common nature or essence. It was the term employed by Greek theological writers to designate the distinct subsistence of the three persons of the Trinity. Originally, the meaning of the word was unsettled, and it was employed in various dialectical combinations. It was used by the Fathers of the Council of Nice, in the sense of *ousia*, essence or substance, and this confusion of phraseology supplied the most formidable weapon to the semi-Arians in the memorable Homoousian (q.v.) controversy. The use of the word hypostasis, however, was settled at a synod held by Athanasius 357; in which it was fully distinguished from *ousia*, and explained as synonomous with *prosopon*, which the Latins rendered by *persona*, person. From that time, the word was adopted into the theological language of the Latin Church, in which it is used indiscriminately with *persona*. The word *persona* itself has, however, undergone changes of meaning: see PERSON. HY'POSTAT'IC, a. *-pō-stăt'ĭk*, also HY'POSTAT'ICAL, a. *-ĭ-kăl*, personal or distinctly personal; relating to the union of the divine and human natures in the person of Christ. HY'POSTAT'ICALLY, ad. *-lĭ*. HYPOSTATIC UNION, union of natures or substances so intimate as to constitute one undivided person. The term is used in theology to describe the mysterious union of the divine and human natures in Christ, in virtue whereof, while each nature is complete, even after union, yet each merges its separate personality in the undivided person of the God-man, to which all the actions, whether divine or human, are ascribed. This form of expression was devised for the purpose of excluding the doctrine of a mere moral union held by Nestorius. See MONOPHYSITES: NESTORIANS: TRINITY.

HYPOSTOME, n. *hī-pŏs'tō-mē* [Gr. *hupo*, under; ***stŏmă***, mouth]: the upper lip or labium of certain crustacea.

HYPOSTYLE, n. *hī'pō-stīl* [Gr. *hūpŏstŭlŏn*—from *hupo*, under; ***stūlŏs***, a pillar]: in *arch.*, a covered colonnade; a pillared court or hall.

HYPOSULPHATE, n. *hī'pō-sŭl'fāt* [Gr. *hupo*, under; Eng. *sulphate*]: a compound of hyposulphuric acid with a base. HY'POSUL'PHITE, n. *-fīt* [Eng. *sulphite*]: a compound of hyposulphurous acid with a base. HY'POSULPHU'RIC, a. *-fū'rĭk* [Eng. *sulphuric*]: applied to an acid containing less oxygen than sulphuric, and more than sulphurous, acid. HY'POSUL'PHUROUS, a. *-fū-rŭs* [Eng. *sulphurous*]: applied to an acid containing less oxygen than sulphurous acid.

HYPOTENUSE, n. *hī-pŏt'ĕ-nūs*, also incorrectly HYPOTHENUSE, n. *hī-pŏth'ĕ-nūs* [L. *hypotenūsă*; Gr *hūpŏteinou'sa*, the subtending line—from Gr. *hūpŏtei'nō*, I subtend—from *hupo*, under; *teinō*, I stretch out, I lay along]: the longest side of a right-angled triangle, or the side opposite the right angle. The well-known property of the H., that the square described on it is equal to the sum of the squares described on the other two sides, is proved in the famous 47th proposition of the first book of Euclid's *Elements*, and has, in the sixth book, been generalized into the following form: the figure described on the H. is equal to the similar figures described on the other two sides. It is said that the 47th proposition was discovered by Pythagoras, who was so overjoyed at his good fortune, that he sacrificed a hecatomb to the Muses. Camerer in his edition of Euclid, gives 17 different demonstrations of this proposition.

HYPOTHALLUS, n. *hī'pō-thăl'lŭs*, HY'POTHAL'LI, n. plu. *-thăl'lī* [Gr. *hupo*, under; Gr. *thallos;* L. *thallus*, a young shoot or branch]: delicate fungoid filaments, upon which a lichen thallus is first developed; the mycelium of certain entophytic fungi.

HYPOTHEC, n. *hī-pŏth'ĕk* [F. *hypothèque*, a mortgage, a pawning of an immovable—from mid. L. *hypŏthēcă*—from Gr. *hūpŏthēkē*, a pledge not delivered, a mortgage—from *hupo*, under; *tĭthēmī*, I put or place]: term in the law of Scotland, from the old Roman law, to denote a lien or security over goods in respect of a debt due by the owner of the goods: Thus a landlord has a hypothec over the furniture or crops of his tenant in respect of the current rent. See LIEN: LANDLORD AND TENANT. HYPOTH'ECATE, v. *-ĕ-kāt*, to assign in pledge as security. HYPOTH'ECATING, imp. HYPOTH'ECATED, pp. HYPOTH'ECATOR, n. *-kā-tėr*, one who. HYPOTH'ECA'TION, n. *-kā'shŭn*, the pledging of a ship for advances made in some critical emergency; the pledging of goods, or of any property, e.g. stocks, as security.

HYPOTHECIUM, n. *hī'pō-thē'shĭ-ŭm* [Gr. *hupo*, under; *thēkē*, a case]: the cellular disk beneath the thalamium in lichens, which bears the thecæ.

HYPOTHENAR EMINENCE, *hī-pŏth'ĕ-nâr* [Gr. *hupo*, under; *thĕnar*, the palm of the hand]: the fleshy mass at the inner border of the hand, consisting of three muscles passing to the little finger.

HYPOTHESIS, n. *hī-pŏth'ĕ-sĭs* [Gr. *hūpŏthĕsĭs*, foundation, supposition—from *hupo*, under; *tĭthēmī*, I put or place, I suppose]: something assumed for the purpose of argument; a system or theory put forward to account for something not understood. HYPOTH'ESES, plu. *-sēz*. HY'POTHET'IC, a. *-thĕt'ĭk*, also HY'POTHET'ICAL, a. *-ĭ-kăl*, assumed; conditional. HY'POTHET'ICALLY, ad. *lĭ*.—*Hypothesis* is much employed in natural science. In endeavoring to explain natural phenomena, we have often to assume or imagine a cause, which, in the first instance, we do not know to be the real cause, but which may be established as such when we find that its consequences agree with the phenomenon to be explained. Every genuine theory was at one stage a mere conjecture, and became a true theory in consequence of being proved or verified by the proper methods. Thus, when it occurred to Newton that the force of gravity on the earth, as exemplified in falling bodies, might extend to the distance of the moon, and might be the power that compelled it to circle round the earth, instead of going off in a straight line through space, the suggestion was only an hypothesis, until such time as he was able to show that it accounted exactly for the facts, and then it became a theory.

A difference of opinion has arisen as to what constitutes a legitimate hypothesis, there being manifestly some necessary limits to the process of imagining possible causes. The case that has chiefly contributed to make this a question is the celebrated undulatory theory of light, a theory, or hypothesis rather, remarkable not only for the extent to which it explains the facts, but for having led to the discovery of new facts by way of inference from the theory itself. Notwithstanding all this amount of coincidence, the ethereal substance whose undulations are supposed to constitute light in its passage from the sun to the earth, is not known to have a real existence. It is an imaginary element, so happily conceived as to express with fidelity a series of extremely complicated phenomena. This was not the character of Newton's hypothesis as to the motion of the moon; the power supposed by him (the earth's gravity) was an actual or existing force, and was known as such; all that he did was to suggest that it extended as far as the moon. Accordingly, Auguste Comte and J. S. Mill have laid it down as the condition of a sound scientific hypothesis, that the cause assigned to the phenomenon in question should be either a real cause, or capable of being ascertained to be a real cause, and that the liberty given to the scientific inquirer should be confined to imagining its operation in a particular sphere, and the law and amount of its operation, since both these could be verified by experiment and calculation. On the other hand, Dr. Whewell has contended, that an amount of agreement with observed facts, such as has been exemplified by the undulatory hypothesis, is sufficient to establish not merely a hypothesis, but a theory, at least until such a time as some discordant facts arise, when the theory must be modified or abandoned. But whatever name be given to this class of suppositions, it is evident that they must be deemed inferior in scientific value to the other class of suppositions, where no cause or agent is assumed but what is actually known to exist, and where the only question is, the presence of that agent in such manner and amount as to tally with the observed facts. Gravity, heat, electricity, magnetism, are established natural agents, and when we assume any one of these as the cause of some phenomena, we are on safe ground so far, that if it be once shown that they are actually operative in the case that we are dealing with, and that their calculated effect exactly coincides with the observed effect, the explanation is complete and final: no subsequent discovery can disturb a conclusion established in this way. But if we have to assume the very agency itself, or to imagine a power of which we have no experience, the coincidence between the laws of the assumed agency and the laws of the phenomena produces at best but a temporary or provisional evidence, liable to be superseded whenever a still better imagined machinery shall be brought forward. Thus, in the case of light, the first hypothesis, that of Newton himself, was a stream or shower of corpuscles; this gave way to the undulatory ether, whose merit lay in embracing the facts more closely; but we have no security against the ultimate preference of some third supposition which shall displace the second, as that did the first; while, perhaps a day may come when an agency shall be proved to exist capable of explaining the phenomena. Even granting that we must sometimes assume an unknown agent (when an effect seems to be beyond the power of all the recognized forces), yet, in ordinary researches, it is considered a grave objection if the assumed agent be of such a subtle or occult nature, or so far removed from observation, that its existence does not admit of being proved. Such was the doctrine of the Cartesian vortices, and such are any hypotheses as to the shapes, sizes, and distances of the ultimate atoms of matter. Such also is the doctrine of nervous fluids, whereby the impulses of mind are supposed to be propagated between the brain and the other parts of the body. It is now in question whether the doctrine of evolution *as an explanation of the physical universe*, is an established theory, or a hypothesis. Cautious thinkers, noting that some elements which it involves still await verification, while some elements are by their nature scarcely verifiable in man's present state of knowledge, deem it one of the most brilliant, comprehensive, and stimulating hypotheses that the human mind has conceived. Less cautious thinkers are either on the one hand asserting it as proved, or on the other hand denying its possibility. It is safe to class it among hypotheses.

HYPOTRACHELIUM, n. *hī'pō-tră-kē'lĭ-ŭm* [Gr. *hupo*, under; *trăchēlŏs*, the neck]: in *arch.*, that part of the capital of a column which occurs between the shaft and the annulets of the echinus.

HYPOTYPOSIS, n. *hī'pō-tī-pō'sĭs* [Gr. *hupo*, under; *tupos*, a type]: highly descriptive language; imagery.

HYPOXANTHIN, or HYPOXANTHINE, n *hī'pō-zănth'ĭn* [Gr. *hupo*,under; *xanthos*, yellow]: organic substance found in the spleen and muscles of the heart of man, and in the spleen and blood of the ox; a white crystalline powder, almost insoluble in cold hydrochloric acid, very slightly soluble in boiling alcohol, and requiring for solution in water 1,090 equivalents of cold, or 180 of boiling water. Its solution has a neutral reaction.

HYPOZOIC, a. *hī'pō-zō'ĭk* [Gr. *hupo*, under; *zōŏn*, an animal]: in *geol.*, applied to those rocks which have as yet yielded no organic remains, and which lie beneath the un doubtedly fossiliferous strata.

HYPPISH: see HIPPISH.

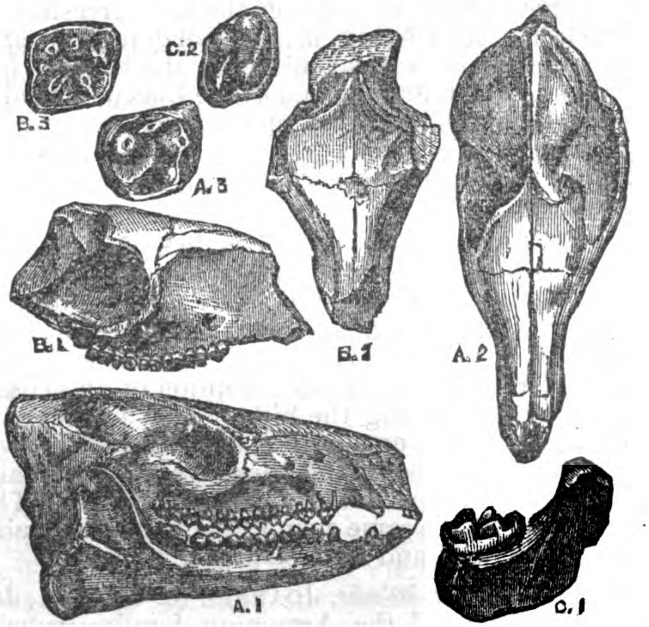
HYPSILAN'TIS: see YPSILANTI.

HYPSISTARIANS, n. *hĭp-sĭs-tār'ĭ-anz* [Gr. *hupsi*, high, aloft; Eng. *arians*]: in *chh. hist.* and *eccles.*, sect of heretics in Cappadocia, 4th c.; their leading principle was the recognition of God as the 'Most High.' Rejecting sacrifices, circumcision, pictures, and images, they observed the Jewish Sabbath and Jewish distinctions as to clean and unclean food, and like the Magians, used fire and lights as symbols of the Deity.

HYPSOMETRY, n. *hĭp-sŏm'ĕ-trĭ* [Gr. *hupsos*, height; *metron*, a measure]: the method of ascertaining heights by the barometer or by boiling water. HYP'SOMET'RICAL, a. pertaining to. HYPSOMETER, n. *hĭp-sŏm'ĕt-ėr*, an instrument for measuring heights: see HEIGHTS, MEASUREMENT OF.

HYPSOPHYLLARY, a. *hĭp'sō-fĭl'lėr-ĭ* [Gr. *hupsos*, top, summit; *phullon*, a leaf]: in *bot.*, applied to leaves which are bracts.

HYRAX, n. *hī'răks* [Gr. *hurax*, the shrew-mouse, a rat]: the rock-badger or rock-rabbit, a small animal not much bigger than a hare, remarkably assimilated to the rhinoceros and tapir; the supposed *coney* of Scripture (see DAMAN). HYRACEUM, n. *hī-rā'sĕ-ŭm*, peculiar substance found in the crevices of the rocks of Table Mountain, Cape of Good Hope. It is one or more of the excrements of the Cape Hyrax (*Hyrax Capensis*): see DAMAN. Hyraceum is a blackish-brown viscid material, not unlike soft pitch, having a strong and offensive taste, not unlike castoreum, for which it has been used as a substitute in medicine. At one time, so large a quantity was found as to suggest the idea of its being used as a manure, but the supply was soon exhausted, and only a small quantity is now imported to meet the demand of the curious pharmaceutist. HYRACOTHERE, *hī'ra-kō-thēr*, animal of the genus Hyracotherium. HYRACOTHERIUM, n. *hi-ră kō-thē'rĭ-ŭm* [Gr. *thērĭŏn*, a wild beast]: in *geol.*, genus of small fossil Pachydermata, belonging to the division Perrysodactyla, the animals of which are characterized by having an odd number of toes. The genus was founded by Owen on the fragmentary remains of two species found in Lower Eocene strata; a third species from the same beds has been since described by him from more complete materials, under the name *Pliolophus vulpiceps;* he considers it only a sub-genus, and as no characteristics appear to separate it generically from the other two, it is here placed as a true hyracothere. The fossil was discovered in a nodule from the Roman cement bed of the London Clay near Harwich, England. It is the most complete Eocene mammalian fossil of the London Clay. It consists of an entire skull and a portion of the rest of the skeleton, including the right humerus and femur, a great part of the left femur, the left tibia, and three metatarsal bones, apparently of the same foot, besides fragments of pelvis, ribs, and vertebræ. The head (fig. A 1 and A 2) is 5 inches long, and 2 inches 2 lines broad; it is slender, tapering gradually from the zygomatic region to the muzzle; the upper outline is straight; the bony rim of the orbit is incomplete behind for about one-fifth of its circumference. The narrow skull and incomplete orbit ally it to the Palæothere; the same form of orbit occurs also in the rhinoceros, and more exactly in the tapir. The straight contour of the skull, and the structure of the nasal aperture, show affinities with the horse and hyrax. The third molar of the upper jaw (fig. A 3) shows the structure of the teeth.



Hyracotherium:

A 1, A 2, skull of *Hyracotherium* (*Pliolophus*) *vulpiceps* (one-third natural size). A 3, molar tooth (natural size).

B 1, B 2, skull of *H. leporinum* (one-third natural size). B 3, molar tooth (natural size).

C 1, portion of lower jaw and tooth of *H. cuniculus* (natural size). C 2, molar tooth (natural size).

The teeth, as well as the form of the lower jaw, show the herbivorous character of the hyracothere. The bones of the leg exhibit ungulate affinities, and their form and proportions are between those of the hyrax and the tapir. The second species was founded on a mutilated cranium (fig. B 1, B 2), rather larger than a hare's, found in the cliffs of London Clay near Herne Bay. It shows a skull very like the first species, though broader at the orbital region. The third molar tooth (fig. B 3) has a larger number of cones than the same tooth in the first species. The third species was founded on several teeth which belonged to a smaller animal than either of the others, found in the Eocene sand underlying the Red Crag at Kyson, in Suffolk. The molar (fig. C 2) has a structure similar to that of the others figured. From the same deposit were obtained two teeth belonging to a lower jaw, one of them, the third molar, still in its socket, and having a fragment of the jaw attached to it (fig. C 1). These teeth were considered by Owen to belong to a quadrumanous animal, and were described by him as *Macacus Eocænus*, 'at once the first terrestrial mammal which has been found in the London Clay, and the first quadrumanous animal hitherto discovered in any country in Tertiary strata so old as the Eocene period.' On the strength of this statement, speculative geologists made good service of this 'monkey.' Owen soon, however, assured himself that the two teeth belong to the third species of hyracothere.

HYRCANIA, *hėr'kā-nė-a:* ancient dist. of Asia; bounded n. by the Caspian Sea (sometimes called *Hyrcanum Mare*) and the Ochus river; e. and. s. by the Sariphi Mountains (now Elburz), which separated it from Parthia; w. by Media. It corresponds with the modern Mazanderán and Asterabad. With the exception of the coast districts, and valleys among the hills, which produced corn, oil, and wine, it was not fertile; dense forests prevailed, through which roamed multitudes of savage animals, the Hyrcanian tiger in particular being celebrated. The inhabitants were of the same stem as the Parthians, and were noted for their wild and rude character.

HYRCANUS, *hėr-kā'nŭs*, JOANNES (or JOHN) I., Jewish high-priest, prince of the Asmonean family: (ruled B.C. 135–105); d. B.C. 105; youngest son of Simon Maccabeus. He was at first tributary to the Syrians; but on the death of Antiochus, made himself independent, subdued the Samaritans on the n., and forced the Idumæans on the s. to adopt the laws and customs of the Jews. He also concluded an alliance with the Romans, or rather confirmed that which his father had made; built the fortress of Baris on the n.e angle of Mount Moriah, and extended his territories almost to the ancient limits of the Davidian monarchy. He is also supposed to have founded the Sanhedrim (q.v.). Originally a Pharisee, he subsequently attached himself to the party of the Sadducees, who were anxious to keep on good terms with the Romans, and who discountenanced the turbulent religious patriotism of the

Jewish masses. H. was, comparatively speaking, a just and enlightened ruler, and the country prospered during his reign. He left five sons, of whom Aristobulus (the eldest) and Alexander governed with the title of king.

HYRCA'NUS, Joannes (or John) II., Jewish high-priest, prince of the Asmonean family: (ruled B.C. 78–40); d. B.C. 30; son of Alexander Jannæus by his wife Alexandra, and grandson of John Hyrcanus I. He was a feeble prince. On the death of his father (B.C. 78) he was appointed high-priest by his mother Alexandra, who ruled Judea herself for the next nine years. After her death (B.C. 69), his younger brother, Aristobulus, braver and more energetic, seized the government, and forced H. to withdraw into private life. Induced by the Idumæan, Antipater, and aided by Aretas, King of Arabia Petræa, he endeavored to win back his dominions, but was not successful until Pompey began to favor his cause. After years of tumultuous fighting, Aristobulus was poisoned by the partisans of Ptolemy (B.C. 49), and H., who had for some time held the nominal dignity of high-priest and ethnarch, was now deprived of the latter of these offices, for which he was wholly incompetent. Cæsar (B.C. 47), on account of the services rendered to him by Antipater, made the latter procurator of Judea, and thus left in his hands all the real power, H. busying himself only with the affairs of the priesthood and temple. Troubles, however, were in store for him. Antipater was assassinated, and Antigonus, son of Aristobulus, with the help of the Parthian king, Orodes I., invaded the land, captured H. by treachery, cut off his ears, and thus disqualified him for the office of high-priest, and carried him away to Seleucia on the Tigris. Some years later, Herod, son of his old friend Antipater, obtained supreme power in Judea, and invited the aged H. home to Jerusalem, B.C. 33. He was allowed to depart, and for about three years lived in ease and comfort; but falling under suspicion of intriguing against Herod, was put to death.

HYRTL, *hĕr'tl*, Joseph: anatomist: born 1811, Eisenstadt, Hungary. He studied at Vienna, and early acquired eminence as a scientific anatomist, and for the extreme beauty of his anatomical preparations. He became prof. of anatomy, Prague, 1837, and Vienna, 1845. While yet a student, he enriched the Anatomical Museum of Vienna with many preparations. He has written many books and articles on comparative anatomy, and the anatomy of the ear: of these the two principal are *Lehrbuch der Anatomie des Menschen* (1847, 13th ed. 1875), and *Handbuch der Topographischen Anatomie* (1847; 6th ed. 1871). The former is a text-book in all German universities, and has been translated into various languages. H. formed a museum of comparative anatomy at Vienna, and became rector of the univ. there, resigning 1874.

HYSON. n. *hī'sŭn* [Chinese, *hi-tshun*, first crop]. a fine sort of green tea.

HYSSOP, n. *hĭs'sŭp* [L. *hyssōpŭs:* Gr. *hŭssōpŏs*], (***Hyssopus***): genus of plants of nat. ord. *Labiatæ*, distinguished by four straight diverging stamens, and a calyx with 15 ribs. The known species are few. The Common H. (*H. officinalis*) is a native of s. Europe and the East. It is found on the Alps of Austria. It is a half-shrubby plant. about 1½ ft. high, the upper part of the stems quadrangular, the leaves evergreen and lanceolate, the flowers in one-sided whorled racemes. The flowers are generally of a very beautiful blue. It has an agreeable aromatic odor. It has long been in cultivation for its leaves and young shoots, which are sometimes used for culinary purposes as a seasoning, but more generally dried as a stomachic and carminative. A syrup made with them is a popular remedy for colds. The virtues of H. depend on a volatile oil.—It is very doubtful what plant is the H. of the Bible. It has been supposed to be some species of *Phytolacca* (q.v.), as *P. acinosa*, native of the Himalaya; but of late arguments have been advanced in favor of the common Caper (q.v.); and more recently, for a plant allied to the Wild Thyme. HEDGE H. is *Gratiola officinalis*: see GRATIOLA.

Common Hyssop
(*Hyssopus officinalis*).

HYSTERANTHOUS, a. *hĭs'tĕr-ăn'thŭs* [Gr. *hustĕros*, after; *anthos*, a flower]: in *bot.*, applied to plants whose leaves expand after the flowers have opened.

HYSTERIA, *hĭs-tē'rĭ-a:* disease which simulates so many other diseases, that its brief description is difficult. The hysterical fit or paroxysm—the most marked form or manifestation of the disorder—is almost, though not exclusively, confined to women, and chiefly to young women. In a severe case, the trunk and limbs are strongly convulsed; the patient struggles violently, retracting and extending her legs, and twisting her body with such force that the aid of three or four strong persons is often required to prevent a slight and apparently feeble girl from injuring herself or others. 'The head,' says Dr. Watson in his Lectures, 'is generally thrown backward, and the throat projects; the face is flushed; the eyelids are closed and tremulous; the nostrils distended; the jaws often firmly shut; but their is no distortion of the countenance. If the hands are left at liberty, she will often strike her breast repeatedly and quickly, or carry her fingers to her throat, as if to remove some oppression there; or she will sometimes tear her hair, or rend her clothes, or attempt to bite those about her. After a short time, this violent agitation is calmed; but the patient lies panting, and trembling, and starting at the slightest noise or the gentlest touch; or sometimes she remains motionless during the remission, with a fixed eye; till all at once the convulsive movements are renewed; and this alternation of spasm and quiet will go on for a space of time that varies considerably in different cases; and the whole attack frequently terminates in an explosion of tears, and sobs, and convulsive laughter.' In another less frequent form of the affection, the patient suddenly sinks down insensible and without convulsions: after remaining for some time in this state, with flushed cheeks, a turgid neck, and irregular breathing, she recovers consciousness, but remains for some time depressed in spirits and fatigued.

During the attack, especially in the first variety, the patient complains of uneasiness in the abdomen, and of a sensation as if a ball were rolling about, and rising first to the region of the stomach, and then to the throat, where she feels as if she were being choked. The abdomen is distended with wind, which moves with a loud rumbling sound along the intestinal canal, and is often discharged by eructation. Toward the close of the fit, but usually after it is over, a large quantity of pale limpid urine is discharged.

In many respects, this affection resembles epilepsy (q.v.). According to Dr. Marshall Hall, the most essential difference is this: that in H., much as the larynx may be affected, it *is never* closed; while in epilepsy, it *is* closed. Hence, in H. there is heaving, sighing, inspiration; and in epilepsy, violent, ineffectual efforts at expiration. The hysterical fit varies in duration from a quarter of an hour or less to many hours.

The persons who suffer from H. are usually young women in whom the process of menstruation is disordered, and who are either naturally feeble, or have been debilitated by disease or want; and in patients of this kind, the hysteria, or the hysterical tendency, is apt to show itself in mimicking so closely many of the most important diseases, that the physician has often great difficulty in determining the true nature of the case. Among the disorders thus simulated by H. are, inflammation of the peritoneum (or peritonitis, q.v.), various forms of palsy, inflammation of the larynx (or laryngitis, q.v.), inability to swallow (or dysphagia), painful affection of the breast, disease of the hip and knee joints, and disease of the spine. Many of these cases of pseudo-disease come to a sudden favorable termination under some strong mental or moral emotions. Persons in England old enough to recollect the morbid religious excitement that prevailed when Irving and his followers believed in the 'unknown tongues,' may remember the remarkable, or, as many regarded it, the miraculous cure of a young paralytic lady, who was made to believe that if, on a certain day, she prayed for recovery with sufficient faith, her prayer would be answered, and she would recover at once. She did so, and her palsy instantly disappeared. This case, regarded by the believers in the movement as a direct answer to prayer, and as inaugurating a new era of miraculous cures, admits of easy and rational explanation by some psychologists. There are various instances on record where, in a similar way, an alarm of fire has instantly cured a hysterical paralysis that had lasted for years. In these cases, the patient is not guilty of wilfully deceiving the physician; but in other instances patients have practiced the most remarkable impositions, pretending by various frauds to be suffering from spitting of blood, from stone in the bladder, etc., or to be living without food of any kind.

H. is a very troublesome affection to deal with, because it is readily induced by example, or, as Dr. Watson terms it, is propagable by moral contagion. If, in a hospital ward or in a factory where many young women are congregated, one girl goes off into a fit, all the others who may happen to have a hysterical tendency will probably follow her example. In such cases, a decided order that the next girl who is attacked shall be treated with the actual cautery, or even with the cold affusion, will often have a marvellous effect in checking the spread of the disorder. During the fit, the treatment to be adopted is to prevent the patient from injuring herself, to loosen her dress, and to admit abundance of fresh cool air; to dash cold water on the face and chest; and, if she can swallow, to administer a couple of ounces of the asafetida mixture, or a dram of the ammoniated tincture of valerian in a wine-glass of water. After the paroxysm is over, the patient should have an active purge, and the bowels should be kept properly open by aloetic aperients; the shower-bath, preparations of iron, and tonic treatment generally should be adopted; and all abnormal bodily and mental excitement, such as late parties in hot rooms, novel-reading, etc., carefully avoided.

HYSTERICS, n. plu. *hĭs-tĕr'ĭks* [OF. *hysterique*—from Gr. *hustĕr'ĭkŏs*, caused by the womb—from *hustĕră*, the womb]: nervous disease or affection peculiar to women, called also Hyste'ria, n. *-tē'rĭ-ă* (q.v.). Hyster'ic, a. *-tĕr'ĭk*, or Hyster'ical, a. *-ĭ-kăl*, affected with, or liable to, hysterics. Hysterotomy, n. *hĭs'tėr-ŏt'ō-mĭ* [Gr. *tŏmē*, a cutting]: surgical operation of cutting an unborn infant out of the womb: see Cesarian Operation.

HYSTERON-PROTERON, n. *hĭs-tėr-ŏn-prŏt'ėr-ŏn* [Gr. *husteron*, last; *proteron*, before others]: in *rhet.*, figure of speech in which that word which should properly come last is placed first, as, *valet atque vivit*, he is well and lives; an inversion of the natural or logical order; as placing the conclusion before the premises, etc.

HYSTEROPHYTA, n. plu. *hĭs'tėr-ŏf'ĭ-tă*, or Hysterophytes, n. plu. *hĭs-tĕr'ō-fītz* [Gr. *hŭstĕra*, the womb; *phuton*, a plant]: another name for the order Fungi; plants living upon dead or living organic matter, as the Fungi.

HYSTRICIDÆ, n. *hĭs-trĭs'ĭ-dē* [L. *hystrix;* Gr. *hustrix*, a hedgehog]: a family of *Rodentia* having the body covered by quills, or long spines mixed with bristly hairs; the typical genus of the family is *Hystrix:* see PORCUPINE.

HYS'TRIX: see PORCUPINE.

HYTHE, *hīth:* parlimentary and municipal borough and market-town of England, one of the Cinque Ports (q.v.); in the county of Kent, 14 m. s. of Canterbury, about half a mile from the coast of the English Channel, at the e. end of Romney Marsh. Lympne or Limne (*Portus Lemanis* of the Romans), the ancient castle and harbor, about 2½ m. w. of H., is now about two m. from the coast, the sea having gradually retired, first, to w. Hythe, and then to the present haven, which is still silting up. The town stands chiefly at the foot of a cliff, and consists of one main street parallel to the sea, with smaller branch streets. It has an interesting church, partly Norman and partly Early English: under the chancel is an extraordinary collection of human skulls and bones—many of the skulls having deep cuts in them—the age and origin of which are unknown. H. is now a place of great resort in the bathing season. It is about a m. from the Folkestone and Dover railway. The parliamentary borough of H. includes Folkestone, Sandgate, and some smaller places. Pop. of municipal borough, which includes w. Hythe (1881), 4,069.

HYTHE SCHOOL OF MUS'KETRY: see MUSKETRY, SCHOOL OF.

HYTU': see ITU.

I

I, pron. *ī* [Ger. *ich;* Icel. *eg;* L. and Gr. *ĕgŏ*, I]: the person who is speaking; one's self.

I, or i, *ī:* ninth letter in the alphabets of w. Europe, third of the English vowels; called by the Greeks *Iota*, after its Shemitic name (Heb. *Yodh* or *Jod*), which signifies 'hand.' The oldest forms of the letter, denoting the palatal semivowel *y* (Heb. *Yodh*), as seen in the Phœnician and Samaritan, have a rude resemblance to a hand with three fingers; but by gradual simplification, the character came to be the smallest in the alphabet, and 'iota' or 'jot' is a synonym for a trifle. The original sound of the letter, and that which is considered its proper sound in all languages except English, is that given to Eng *e* in *me;* with this power, it forms one of the fundamental vowels *i*, *a*, *u* (see A: also LETTERS AND ARTICULATE SOUNDS). What is called the long sound of *i* in Eng. is really the diphthong *ai* rapidly pronounced. For the power that the vowel *i*, followed by another vowel, has of turning the preceding consonant into a sibilant, see the letter C; further instances are seen in such French words as *rage*, *singe*, from Lat. *rabies*, *simia*. In Lat., there was but one character for the vowel *i* and the semi-vowel now denoted by the character *j;* and in English the two letters were formerly treated as the same letter, and appeared as such till recently in all English dictionaries: J is now reckoned a consonant and treated as such: see J.

IABADIUS, *ī-a-bā'dĭ-ŭs:* immense fertile island of the E. Indies, rich in gold; mentioned by Ptolemy as near Malacca; prob. the island now called Java.

IAGO, n. *ē-â'gō* or *yâ'gō:* in *Shakespeare*, an ensign of Othello the Moor, who, hating his master from jealousy and frustrated hopes of advancement, stimulated the Moor to such jealousy that he slew his bride Desdemona.

IAMBIC, n. *ī-ăm'bĭk* [L. *ĭămbus;* Gr. *iambos*]: a poetic foot of two syllables, the first short, the second long or accented: ADJ. pertaining to. IAM'BICS, n. plu. *-bĭks*, a piece of poetry consisting of short and long syllables alternately. IAM'BICALLY, ad. *-kăl-lĭ.* IAMBIC VERSE, in classic prosody, and sometimes in English, poetry having the foot or metre called *Iambus*, consisting of two syllables, of which the first is short, and the second long (⌢ —). Archilochus (q.v.) is the reputed inventor of iambic verse. The English language runs more easily and naturally in this metre than in any other. See METRE: VERSE.

> **Thĕ stāg | ăt ēve | hăd drŭnk | hĭs fĭll.**
>
> *Lady of the Lake.*

IAMBLICHUS, *ī-ăm'blĭ-kŭs* or *ē-ăm'blē-kŭs:* Syrian freedman, at the end of the reign of Trajan and beginning of that of M. Aurelius (117–169). He was instructed by a Babylonian in the language, manners, and literature of Babylon, and wrote the *Babylonica*, or Loves of Rhodanes and Sinonis, in 16 or 39 books, which has been preserved by Photius, c. xciv., and Leo Allatius. It is the oldest of the novels of antiquity which has reached the present day, but has no merit of style or plot.

IAM'BLICHUS: philosopher, in the reign of Constantine, about 310: b. Chalcis, in Cœle-Syria; d. prob. before 333; of an illustrious and wealthy family. He was pupil of Anatolius and Porphyry; and he belonged to the Neo-Platonic school of Plotinus, whose doctrines he extended. Little is known of his life; but he was followed by a numerous school, who listened with enthusiasm and respect, and who thought that he was inspired, had intercourse with the gods, and could divine and perform miracles. This, with the learned philosophic haze which he threw around the popular superstitions brought him immense veneration; though he himself did not claim miraculous power. His doctrines were a syncretic mixture of Pythagorean and Platonic ideas, mixed with superstition and magic, and the supposed manifestation of God by ecstasies and a communication with the spiritual world by ceremonies. One of his great works; On the Choice of Pythagoras (*Peri Aireseos Pythagorou*) consisted of 10 books, of which there remains the 1st, A Life of Pythagoras, filled with prodigies, and evidently written against Christianity. 2d, An Exhortation to Philosophy (*Protreptikoi Logoi eis Philosophian*), an ill-arranged introduction to Plato. 3d, On the Common Knowledge of Mathematics (*Peri Koines Mathematikes Epistemes*), full of fragments of Pythagoras, Philolaus, and Archytas. 4th, On the Arithmetical Introduction of Nicomachus. The 5th and 6th books are lost. The 7th, The Theology of Arithmetic (*Ta Theologoumena tes Arithmetikes*); the 8th, the History of Music; the 9th Geometry; the 10th, On the Study of Heavenly Bodies. He also wrote a work on the Soul, commentaries on Plato and Aristotle, another on the complete Chaldæan Philosophy, another on Beginnings, and one on Sacred Images, in which he affirmed that the gods resided in their statues. His celebrated work on the Mysteries (*Peri Musteriôn*) is disputed; it is drawn up as the answer of Abammon, a priest, to a letter addressed to his pupil, Anebo, by Porphyry. It contains many Egyptian doctrines, and esoterical explanations derived from the Hermetic Books, the writings of Bitys and others, mixed with Pythagorean and Neo-Platonic ideas. The style of I. is not careful, and is inferior to Porphyry. I. is supposed to have died at Alexandria. See Eudocia, *Violetum*, p. 244; Eunapius, *Vit. Philosoph.*, p. 20; Hebensbreit, *De Iamblicho* (Leip. 1744); Brucker, *Hist. Crit. Phil.*, II. 260. *Iamblichus*, a Gale, fo. (Ox. 1678).

Several other writers of this name are known: e.g. IAM-

BLICHUS, younger philosopher of the Neo-Platonic school, b. at Apamea, supposed nephew of the preceding, praised by Libanius to Julian the Apostate.

IANTHE, n. *ī-ăn'thē:* in *myth.*, a girl of Crete who married Iphis; one of the Oceanides; one of the Nereides.

IAN'THINA: see JANTHINA.

IAPETUS, *ī-ăp'ĕ-tŭs:* in Greek and Roman myth., the father of the human race; son of Cœlus and Terra (Heaven and Earth), and father of Atlas, Prometheus, and Epimetheus. Similarity of name has led some to deem him the same as Japheth, son of Noah, one of the three progenitors of the world's new population after the flood: this identification has no evidence. In *astron.* I. is one of the satellites of Saturn.

IATRALIPTES, n. *ī-ā'tră-lĭp'tēz* [L. *ĭātralip'tēs*, an ointment doctor—from Gr. *ĭātrŏs*, a surgeon; *aleiptēs*, an anointer—from *aleiphō*, I anoint]: one who professed to cure diseases by anointing and friction. IA'TRALIP'TIC, a. *-lĭp'tĭk*, having the property of curing by anointing and rubbing.

IATRO-MATHEMATICIAN, n. *ī-ā'trō-măth'ĕ-mă-tĭsh'ăn* [Gr. *ĭātrŏs*, a physician; and *mathematician*]: one of a school of physicians who explain the functions of the body and the action of remedies on mechanical principles.

IBARRA, *ē-bâr'râ*, or SAN MIGUEL DE IBARRA, *sân mĕ-ghĕl' dā ē-bâr'râ:* town of Ecuador, S. America, dept. of Quito, 60 m. n.e. of the town of Quito. It is on the n. base of the volcano of Imbabura, is well built, and has manufactures of wool and cotton. Pop. estimated about 10,000.

IBERIA, n. *ĭb-ē'rĭ-ă:* the ancient name for Spain; the country forming the basin of the *Ibe'rus*, or *E'bro:* see HISPANIA: GEORGIA. IBERIAN, n. one of the original inhabitants of Spain.

IBE'RIS: see CANDYTUFT.

IBERVILLE, *ē-bĕr-vēl'*, PIERRE LE MOYNE, Sieur d': 1661, July 16—1706, July 9; b. Montreal: founder of Louisiana. He entered the French navy when 14 years old, served in De Troye's overland expedition from Canada against the English forts on Hudson's Bay, captured several English vessels and reduced Fort Quitchitchonen 1688–9, was a leader in the Schenectady expedition 1690, given command of a frigate 1692, captured Fort Nelson on Hudson Bay 1694, reduced Fort Bourbon 1697, sailed into Mobile Bay with 200 settlers 1699, Jan. 31, discovered Pascagoula river, and built Fort Biloxi 1699, ascended the Mississippi river 1700, revisited La. 1701, colonized Ala., was promoted capt. of a line of battle-ship 1702, captured the island of Nevis 1706, and died suddenly in Havana.

IBEX, n. *ī'bĕks* [L. *ibex*, the ibex]: wild goat of the mountains: ancient Bouquetin (q.v.), or Steinbock of the Alps; and now, according to some zoologists, a genus of the goat family, or sub-genus of goat, having the horns flat, and marked with prominent transverse knots in front, whereas those of the true goats are compressed and keeled in front, and rounded behind. The species all inhabit high mountainous regions of Europe, Asia, and Africa. The I. of the Caucasus and the I. of the Pyrenees differ a little from the I. of the Alps, and from one another, but the differences may perhaps be regarded as those of varieties rather than of species.

The conventional ibex in Heraldry resembles the heraldic antelope in all respects, except that the horns are straight and serrated.

IBICUI, or Ibicuy, *ē-bē-kwē':* important affluent of the Uruguay river (q.v.)

IBIDEM, ad. *ĭb-ī'dĕm:* with its contr. Ibid., *ĭb'ĭd* [L. *ĭbīdĕm*]: in the same place.

IBIS, *ī'bĭs* (Gr. and L.]: genus of birds of the family *Ardeidæ*, or, according to some ornithologists, of *Scolopacidæ*, and perhaps to be regarded as a connecting link between them. The bill is long, slender, curved, thick at the base, the point rather obtuse, the upper mandible deeply grooved throughout its length. The face, and generally the greater part of the head, and sometimes even the neck, are destitute of feathers, at least in adult birds. The neck is long. The legs are rather long, naked above the tarsal joint, with three partially united toes in front, and one behind; the wings are moderately long; the tail is very short. The Sacred I. or Egyptian I. (*I. religiosa*), is an African bird, two ft. six inches in length, though the body is little larger than that of a common fowl. —The Glossy I. (*I. falcinellus*) is a smaller species, also African, but migrating northward into continental Europe, and occasionally seen in Britain. It is also a N. American bird. Its habits resemble those of the sacred ibis. Its color is black, varied with reddish brown, and exhibiting fine purple and green reflections. It has no loose pendent feathers.—The White I. I. (*I. alba*), a species with pure white plumage, abounds on the coasts of Florida. Audubon saw multitudes on a low islet, and counted 47 nests on a single tree. The Scarlet I. (*I. ruber*) is a tropical American species, remarkable for brilliant plumage, which is scarlet, with a few patches of glossy black.—The Straw-necked I. (*I.* or *Geronticus spinicollis*) is a large Australian bird of fine plumage, remarkable for stiff naked yellow feather-shafts on the neck and throat.

Sacred Ibis.

The SACRED IBIS, one of the birds worshipped by the ancient Egyptians, and called by them *Hab* or *Hib*, and by the modern Egyptians *Abu-Hannes* (i.e., Father John), is a bird with long beak and legs, and a heart-shaped body, with black and white plumage. It was supposed, from the color of its feathers, to symbolize the light and shade of the moon, its body to represent the heart; its legs described a triangle, and with its beak it performed a medical operation; from all of which esoterical ideas it was the avatar of the god Thoth or Hermes (see HERMES), who escaped in that shape the pursuit of Typhon, as the hawk was the avatar of Ra, or Horus, the sun. The feathers of the I. were supposed to scare, and even kill, the crocodile. It appeared in Egypt at the rise, and disappeared at the inundation of the Nile, and was thought, at that time, to deliver Egypt from the winged and other serpents which came from Arabia in certain narrow passes. As it did not make its nest in Egypt, it was thought to be self-engendering, and to lay eggs for a lunar month. According to some the basilisk was engendered by it. It was celebrated for its purity, and drank only from the purest water, and the most strict of the priesthood drank only of the pools where it had been seen; besides which, it was fabled to entertain the most invincible love of Egypt, and to die of self-starvation if transported elsewhere. Its flesh was thought to be incorruptible after death, and to kill it was punishable with death. Ibises were kept in the temples, and unmolested in the neighborhood of cities. After death they were mummied, and there is no animal of which so many remains have been found at Thebes, Memphis, Hermopolis Magna, or Eshmun, and at Ibiu or Ibeum, 14 m. n. of Eshmun. They are made up into a conical shape, the wings flat, the legs bent back to the breast, the head placed on the left side, and the beak under the tail. They were prepared as other mummies, and wrapped up in linen bandages, which are sometimes plaited in patterns externally. At Thebes, they are found in linen bandages only: at Hermopolis, well preserved in wooden or stone boxes of oblong form, sometimes in form of the bird itself, or the god Thoth; at Memphis, in conical sugar-loaf-shaped red earthenware jars, the tail downward, the cover of convex form, cemented by lime. There appear to be two sorts of embalmed ibises—a smaller one of the size of a corncrake, very black, and the other black and white—the *Ibis Numenius* or *Ibis religiosa.* This last is usually found with its eggs, and with its insect food, the *Pimelia pilosa, Akis reflexa,* and portions of snakes, in the stomach. It is said to resemble the I. of India rather then that of Africa. By the Jews, it was held to be an unclean bird.—Wilkinson, *Manners and Customs,* v. 7, 217; Passoloegua, *Catalogue Raisonné,* p. 255, Pettigrew, *History of Mummies,* p. 205; *Horapollo,* i. c. 30, 36.

IBN EZ'RA: see ABEN-ESRA.

IBN SI'NA: see AVICENNA.

IBRAHIM PASHA, *ĭb-râ-hēm' pâ-shâ'*, Viceroy of Egypt· 1789–1848, Nov. 9 (ruled 1844–48); b. Cavalla, Roumania;

real or adopted son of Mohammed Ali, whom he succeeded as viceroy. He gave the first proofs of his gallantry and generalship 1819, in quelling the insurrection of the Wahabis. He afterward subdued Sennaar and Darfur. He invaded the Morea at the head of an Egyptian army 1825, with the view of reducing it under the power of Mohammed Ali; but the intervention of the great powers in the affairs of Greece compelled him to abandon this enterprise 1828. Mohammed Ali having conceived the design of adding Syria to his dominions, Ibrahim crossed the Egyptian border with an army, 1831, Oct., took Acre by storm, and quickly made himself master of the whole of Syria. A peace was concluded 1833, May 4, the Turks not only giving up Syria, but also transferring Adana to Ibrahim personally, on a kind of lease. When war broke out again between Mohammed Ali and the sultan 1839, Ibrahim was again successful, totally routing the Turks in the great battle of Nisib June 24. The interference of the great powers eventually compelled him to relinquish all his Syrian conquests, and to return to Egypt. During his passage through the desert, he suffered terrible hardships and losses, and the attempt to elevate Egypt to independence came to an end. In 1844, this great commander was called to be viceroy; and in 1848, when his aged father had sunk into absolute dotage, I. went to Constantinople, and was installed by the Porte as Viceroy of Egypt; but in a few months he died at Cairo. He was succeeded, not by any of his own children, but by Abbas Pasha, favorite grandson of Mohammed Ali.

IBRAIL′, or IBRAI′LA, or BRAI′LA, or BRAILOW′: see BRAHILOV.

ICACINA, n. *ī-kăs-ī′na* [Sp. *icaco*, *Chrysobalanus icaca*, which Icacina resembles]: typical genus of the order *Icacinaceæ*, a tribe of *Olacaceæ* sometimes elevated into a distinct order; found in the E. Indies, Africa, and S. America.

ICARIAN, a. *ī-kā′rĭ-ăn* [Gr. *Ikăriŏs;* L. *Icărĭŭs*, of or pertaining to *Icărus*, the son of Dædalus, who, attempting to fly with artificial wings too near the sun, the wax that cemented them was melted, and he fell into the sea]: adventurous; soaring too high for safety: see DÆDALUS.

ICE, n. *īs* [Icel. *is;* Ger. *eis;* Dut. *ijs*, ice]: frozen water; water in a solid state; a sweetmeat congealed by ice or a freezing mixture: V. to chill; to cover with ice; to cover with a concretion of sugar. IC′ING, imp.: N. the act of covering with ice; the giving the appearance of ice to anything; the fine preparation of white sugar employed to adorn cakes, etc. ICED, pp. *īst:* ADJ. chilled with ice; frosted with sugar. ICICLE, n. *īs′ĭ-kl* [AS. *ises gicel;* Low Ger. *ishekel;* Dut. *ijs-kegel*, an icicle—the latter element being the Icel. *jökull*, a mass of ice]: a pendant or conical mass of ice hanging from the eaves of a house, etc. ICY, a. *īs′ĭ*, full of ice; consisting of ice; having the nature of ice; very cold; frigid; without affection. IC′INESS, n. *-ĭ-nĕs*, state of being very cold. TO BREAK THE ICE, to begin a subject or topic; to remove the first obstructions or difficulties. ICE′BERG, n. *-bĕrg* [Ger. *eis*, ice: Sw. or Ger. *berg*, a mountain]: mountainous mass of ice floating in the polar seas; such masses when flat are called *field-ice*, when smaller in size *floes* (see ICE, below). ICE-BLINK [Dan. *iisblink;* Sw. *isblink*]: a distant bright appearance arising from the reflection of light from ice, seen before the ice itself; a field of ice extending far into the interior of Greenland, so named from its shining appearance. ICE-BOUND, totally surrounded with ice, so as to hinder access or advance. ICE-CREAM, cream flavored and congealed, corrupted from ICED-CREAM. ICE-FIELD, a very great extent of ice in the arctic seas. ICE-FLOE, a mass of floating ice. ICE-HOUSE, a place for storing and preserving ice for use, especially in warm weather. ICE-PACK, broken and drifting ice again united into an irregular mass. ICE-PLOW, a sort of plow for making grooves on ice and breaking it up. ICE-SPAR, a transparent variety of orthoclase or common prismatic felspar. ICE′FOOT, n. *-fût*, the name given to the narrow fringe of ice which forms every winter along boreal shores, rising to a height of 20 or 30 feet above sea-level, and stretching in breadth from 120 to 130 feet. ICE-BROOK TEMPER, in *Spain*, the temper given to a sword by plunging it into icy-cold water.

ICE: water in the solid crystalline form. It is specifically lighter than water which is just about to freeze, and therefore floats in it. Water, in becoming solid, expands about $\frac{1}{9}$ of its volume or bulk. The formation of ice takes place generally at the surface of water. This is owing to the peculiarity that when water has cooled down to within 7°·4 of freezing, it ceases to contract, as before, with increase of cold, and begins to expand until it freezes; which causes the coldest portions of the water to be always floating on the surface. In some circumstances, however, not fully explained, ice forms at the bottom of rivers, and is called ground-ice.

Water in ordinary cases freezes at the degree of heat marked 32° on Farenheit's thermometer, and 0° on the Centigrade and Reaumur's; but if kept perfectly still, it may be cooled to nearly 22° F. below freezing, and still remain liquid. The least shake, however, or the throwing in a solid body, makes a portion of it freeze instantly, and its temperature rises immediately to 32°. Sea-water, and salt water in general, freezes at a lower temperature than pure water; in doing which, part of the salt separates, and the ice, when melted, gives water that is fresher than the original. The color of pure ice is deep blue, discernible, however, only when it is in large masses: it is best seen in the clefts of a glacier or an iceberg.

In the neighborhood of the poles, and on mountains of a certain height in all latitudes, there are immense masses of permanent ice; and even in some districts of Siberia, where a kind of culture is practicable in summer, there are found at a certain depth below the surface of the earth strata of ice mingled with sand. In sinking a well at Yakutsk, the soil was found frozen hard to the depth of 382 ft., and consisting in some parts entirely of ice. These permanent masses of ice must be classed with rocks and mountains, as among the solid constituents of the globe. In the lower regions of the torrid zone there is no ice, and in the temperate zones, it is a passing phenomenon. From the polar ice-fields and glaciers which are always protruding themselves into the sea, great floating masses become detached, and form *icebergs*, floes, and drift-ice. These bergs or mountains of ice are sometimes more than 250 ft. above sea-level. They present the appearance of dazzling white chalk-cliffs of most fantastic shapes. Fresh fractures have a green or blue color. From the specific gravity, it is calculated that the volume of an iceberg below the water is eight times that of the protruding part. Icebergs, and floes or ice-fields, are often laden with pieces of rock and masses of stones and detritus, which they have brought with them from the coasts where they were formed, and which they sometimes transport far toward the equator. These floating mountainous islands of ice are dangerous to navigation.

The hardness and strength of ice increase with the degree of cold. In the severe winter of 1740, a house was built of the ice of the Neva at St. Petersburg 50 ft. long, 16 wide, and 20 high, and the walls supported the roof, also of ice, without the least injury. Before it stood two ice-mortars and six ice-cannon, made on the turning-lathe, with carriages and wheels also of ice. The cannon were of the calibre of 6-pounders, but they were loaded with only ¼ lb. of powder, and with hemp-balls—on one occasion with iron. The thickness of the ice was only four inches, and yet it resisted the explosion. In recent years, ice-structures in the semblance of palaces, of great size and beautiful with a variety of colors, have been reared in several places, notably in Montreal.

About 24 years ago, Faraday called attention to a remarkable property of ice, since (incorrectly) called Regelation. He endeavored to account for the fact, that two slabs of ice, with flat surfaces, placed in contact, unite into one mass when the temperature of the surrounding air is considerably *above* the freezing-point, by assuming that a small quantity of water, surrounded on every side by ice, has a natural tendency to become ice; and the fact, that two blocks of ice placed in contact do not unite unless they are *moist*, seems to bear out this idea. But J. Thomson gave a totally different explanation of this phenomenon. He showed that the capillary force of the film of water between the plates is sufficient to account for a very considerable pressure between them; so that from his point of view the phenomenon would be identical with the making of snowballs by pressure; and with the formation, by a hydraulic press, of clear blocks from a mass of pounded ice, an observed fact, the explanation of which is to be found in the property of ice mentioned below. See *Proceedings of the Royal Soc.*, 1860-1. Faraday, taking up the question again, showed that the (so-called) regelation takes place in *water* as readily as in air, a fact quite inconsistent with the action of capillary forces. To this, J. Thomson replied, showing, very ingeniously, that the capillary forces that he at first assumed are not necessary to a complete explanation of the observed phenomena. (See reference above.)

Other views of the question are numerous, e.g., that of Persoz, adopted by Forbes, in which ice is considered as essentially colder than water, and as passing through a sort of viscous state before liquefying, as metals do during the process of melting. This idea, however, has not of late found much support; and it is probable that the true solution of the question is, as J. Thomson has lately pointed out, to be found in the analogy of the crystallization of salts from their aqueous solutions.

However that may be, there is no doubt about the following property of ice, theoretically predicted by J. Thomson from the experimental fact of its expanding in the act of freezing, and demonstrated by means of the Piezometer by Sir W. Thomson—viz., that the freezing point of water, or the melting-point of ice, is *lowered by pressure;* and the brothers have, with singular ingenuity, applied this to the explanation of the motion of glaciers. That a mass of glacier-ice moves in its channel like a viscous fluid, was first completely established by Forbes. Thomson's explanation of this motion is of the following purport: In the immense mass of the glacier (even if it were homogeneous, much more so when full of cracks and fissures, as it always is), there are portions subjected to much greater strain than others. The pressure to which they are subjected is such as corresponds to a melting point considerably *below* the temperature of the mass—therefore, at such points, the ice melts, the strain is relieved, and the whole mass is free for an instant to move nearly as a fluid would move in its place. But, the strains being thus for an instant removed, the temperature and pressure of the water are again consistent with freezing—the thin layer of water quickly solidifies, and then matters proceed as before. Thus, at every instant, the strains at different parts of the mass melt it at those places where they are greatest, and so produce the extraordinary phenomenon of a mass which may in common language be termed *solid*, and even *rigid*, slowly creeping down its rocky bed like a stream of tar or treacle.

Ice-Trade and Manufacture —The trade in ice is of great and increasing importance. Ice has always been esteemed a luxury in warm weather; and this early led to the storing of it in winter for summer use. The Greeks, and afterward the Romans, at first preserved snow, closely packed in deep underground cellars. Nero, at a later period, established ice-houses in Rome, similar to those now in use in most European countries. But these means were not enough to supply the luxurious Romans with ice for cooling beverages, and they actually established a trade in snow, which was brought to Rome from the summits of distant mountains.

The trade in ice in Britain has, until lately, been very limited, having been confined chiefly to the supply required by a few of the first-class fishmongers and confectioners—the private residences of opulent families being furnished with ice-houses in which a sufficiency is stored for private use. But the N. Americans have started a trade in this article in their own cities, which has extended to Europe and Asia, and has, in very short time, attained surprising magnitude. The export of ice from America was commenced about 1820, by a merchant named Tudor, who sent ice from Boston to the W. Indies. Persevering against many losses, he established a trade with Calcutta, Madras, and Bombay; and now not only is ice sent in vast quantities to those places, but also to Hong-kong, Whampoa, and Batavia. About 1840, the Wenham Lake (Mass.) Ice Company commenced sending ice to England from Boston, which is the great American port for this shipment; and since then there has been increasing demand, which has brought other companies into the business. The supply for Great Britain, however, now comes almost wholly from Norway; 178,949 tons having been imported thence 1880, of the value of £141,978, while the supplies from other countries were no longer worth mention. Twenty years before, America had sent to Great Britain on an average 20,000 tons annually, selling for about $100,000. Norwegian ice has been sold even in the United States at less price than native ice.

In America the ice is collected chiefly in the neighborhood of Boston, New York, Philadelphia, and other large cities; and the lakes which supply it form no small part of the property of those whose lands border thereon; these lakes have all been carefully marked out, and the right secured, so that, when the winter comes, and the ice is formed, the harvest begins with great regularity. The Hudson river in its upper course yields a very large supply. The ice is cleared from snow by means of an implement called the plane. An ice-plow, drawn by horses, and driven by a man riding upon it, is then made to cut parallel grooves about three inches deep in the ice, and these are again crossed by other grooves at right angles, so that the whole of the surface is deeply marked out into small squares, measuring a little more than 3 ft. After a few of these square blocks have been detached by handsaws, the remainder are easily broken off with crowbars, and floated away to the ice-storehouses, usually built of wood, on the borders of the lake. Some of these are of vast dimensions, and contain vaults of great depth; the walls are double, and sometimes treble, being altogether as much as 4 ft. in thickness, and having hollow spaces between to render them less heat-conducting. The blocks of ice are covered over with sawdust, a layer being placed between each tier of blocks. Many of these ice-houses are large enough to hold 40,000 to 50,000 tons of ice. When fully stored, a large quantity of dried marsh-grass is trodden in upon the top, to the thickness of several feet, and the doors are then securely closed. The yearly consumption of ice by New York city alone amounts to 500,000 tons The total value of the ice annually stored in America has been computed at $4,500,000, and if to this we add the ice-trade of Norway, Sweden, Russia, which from the slight data we possess, is estimated at $3,000,000, we have the remarkable fact, that a value of seven and a half millions of dollars is added to a comparatively small body of water by the mere act of freezing.

Notwithstanding the facilities for importing ice, there is, and always will be, a necessity for procuring it locally if possible. Hence much invention has been given to devising means for artificial freezing: see **FREEZING MIXTURES**. But until recently, the modes of producing ice artificially were too costly to be practically useful. The desideratum, however, is now supplied by machines capable of producing ten tons of ice daily. See **REFRIGERATING MACHINES.**

ICE'LAND: large island in the northernmost part of the Atlantic, on the confines of the Arctic Ocean; n. lat. 63° 23'—66° 33', and w. long. 13° 22'—24° 35'; about 600 m. from Norway, 250 from Greenland, 250 from the Faröe Isles, and more than 500 from the north of Scotland. It belongs to the kingdom of Denmark. Its extreme length e. to w. is more than 300 m., greatest breadth n. to s. about 200; area 39,207 sq. m. Its coasts, particularly on the n. and w., are much broken by bays or *fiords*. In some of the bays are numerous small islands. I. is in many respects one of the most interesting parts of the world. Its physical features are very remarkable, and not less so its history and the character of its inhabitants. It consists in great part of lofty mountains, many of which are active volcanoes; only certain level districts along the coasts, and a few dales, are habitable, or in any degree capable of cultivation, while even there scarcely a tree is to be seen, and the climate is unsuitable for grain. The interior of the island is occupied almost entirely with rugged tracts of naked lava and other volcanic products, vast ice-fields in many places connecting its high mountain summits, among which are prodigious glaciers, in some instances descending even to the coast, they and the torrents which gush from them rendering communication between one inhabited spot and another very difficult and dangerous. Yet here has civilization been long established, and the people, necessarily very poor, have cultivated poetry and other departments of literature with great success.

The highest mountain in the island is Oeräfa Jökul, 6,426 ft. above sea-level. It is in the s.e., and is connected with a vast mountain mass, of which several of the summits are actively volcanic, no less than 3,000 sq. m. being perpetually covered with ice and snow at an elevation varying from 3,000 to above 6,000 ft., while all underneath seems full of either active or smoldering volcanic fire. The most celebrated volcano is Hecla (q.v.). Krafla is perhaps the most noted of a great group of active volcanoes in the n. of the island. The eruptions of Hecla have caused no little devastation, but still more terrible and destructive have been those of Skaptár Jökul and other volcanoes of the same mountain mass, which burst forth for the first time within the historic period, 1362. In repeated instances volcanic islets have been thrown up in the bays and near the coasts of I., which have generally disappeared within a short time. Connected with the volcanic fires are hot springs in great number, some of which flow gently, and others, called *Geysers* (q.v.), gush up at intervals with ebullitions of great violence. Numerous hot springs may in many places be seen sending up their steam in a single little valley, and the Icelanders are accustomed to avail themselves of them for the washing of clothes and other purposes. The water of some springs is lukewarm, while that of others is boiling; some are pure, and some sulphureous. They are subject to great variations, and appear and dry up very suddenly. Earthquakes are frequent, and the island suffered very severely from this cause 1755 and 83. The winter is not generally more severe than that of Denmark, though more protracted; and it is rather the shortness of the summer and the insufficiency of summer heat, with the superabundance of moisture, than the severity of the winter, which is unfavorable to the growth of corn and plants of many other kinds. In the s. portions of I., the longest day lasts 20 hours; the shortest, 4 hours. In the n. districts, the sun does not set for a whole week in midsummer, and for a week in midwinter does not rise above the horizon.

About 20,000 oxen, 30,000 horses, and 400,000 sheep constitute the chief wealth of the inhabitants. The horses are small, but vigorous and active. They receive little attention from their owners, whose oxen require almost all the hay and other fodder that they can store up for the winter. I. ponies have now begun to be imported into Britain. Reindeer were introduced into I. by a public-spirited governor 1770, and have become naturalized in the uninhabited tracts of the interior, where, however, their presence is of little importance. Seals abound on the coasts, where sea-fowls also are extremely numerous, and their flesh, eggs, and feathers are much sought after. Swans, and other *Anatidæ*, frequent the lakes. The Eider Duck is plentiful on many parts of the coast, and its down is a principal article of commerce. Fish of many kinds are abundant on the coasts, salmon and trout in the rivers. The food of the people consists in great part of fish. The cod-fishery is extensively prosecuted by the French, two to three hundred French vessels and about 7,000 seamen being employed in it, under the immediate patronage of the French govt., which aims at thus training seamen for the navy. The salmon-fishery of some of the rivers has begun to be prosecuted for the supply of the London market. The herring-fishery has not hitherto received special attention, but vast shoals of herrings frequent the fiords. The most important agricultural operations are those of the hay-harvest. The seeds of the *Melur*, or Upright Sea Lyme Grass (*Elymus arenarius*), are gathered and used for making pottage and cakes, and are much relished; bread made of imported grain being rather a luxury in the houses of the common people. Meal made of Iceland Moss (q.v) is used in a variety of ways, and this lichen is gathered in large quantities for home use and for exportation. Potatoes, turnips, kale and cabbage, spinage, parsley, radishes, mustard, cresses, etc., are produced in gardens. The mineral wealth of I. has only begun to be developed. In no part of the world is sulphur found in such abundance. Iron ore also is found. There is a peculiar kind of brown coal called *Surtarbrand* (q.v.), which, with drift-wood, is used for fuel on the n. and e. coasts.

It is supposed that the population of I. was once 100,000, but it subsequently diminished. Since 1840, when it amounted to 57,094, a gradual increase has taken place, until in 1880 it had reached 72,000. The people, who are of Scandinavian origin, are distinguished for honesty, purity of morals, and wonderful love of education. Notwithstanding their poverty and other adverse circumstances, it is rare to find an Icelander who cannot read and write. They belong to the Prot. Church. The clergy are, like their parishioners, very poor; they are under one bishop. The Icelanders are strongly attached to their native country, and delight in the study of its history as set forth in ancient *sagas* and poems. Their language is the old Norwegian, preserved in almost its pristine purity: see SCANDINAVIAN LANGUAGES AND LITERATURE. They are rather a small race, and seldom attain a great age. Scurvy was a very common disease, and cases of elephantiasis were frequent, probably due largely to the nature of their food, and to their miserably crowded and unventilated dwellings, which are mostly cottages of the humblest description, built of turf or of pieces of lava, the crevices stuffed with moss, and the roof formed of turf. Scurvy has now entirely disappeared, and elephantiasis is becoming very rare. The knitting of stockings and gloves is a common domestic industry; and with the sale of skins, wool, feathers, eider-down, fish-oil, etc., enables the peasantry to procure a few articles of foreign produce. The chief imports are rye, barley, flour, coffee, liquors, tobacco, sugar, coal, iron, etc. More than 40,000 Danish barrels of grain (of all kinds) are annually imported; also about 427,000 lbs. of coffee, 448,000 quarts of various liquors, 109,000 lbs. of tobacco, 457,000 lbs. of sugar, and 32,000 chaldrons of coal. The annual exports are valued at about $2,000,000, and consist of dried fish, wool, hosiery, tallow, train-oil, lard, salt meat, feathers, skins, and horses. The destruction of meadows by volcanic eruptions, and the interruption of fishing by drift-ice, have sometimes caused great distress Since 1855 free-trade has been in force; 32 authorized trading-places have been opened, of which Reykiavik (pop. 2,024) at the head of a bay in the s.w. of the Island, is the most important. Here the gov. resides, and the *Althing*, a kind of parliament, is held; here are a college, medical and theological schools, a public library of 10,000 vol., a Royal Icelandic Soc., and an observatory; and newspapers and Icelandic books are printed. There is regular steam-communication during summer with Leith and Copenhagen.

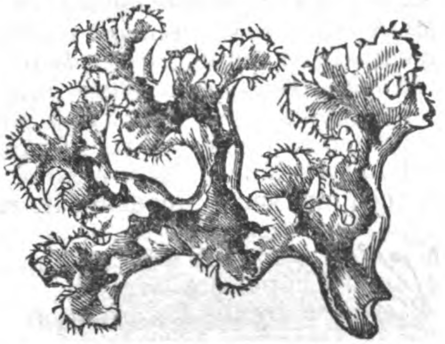
The authentic history of I. begins with the latter half of the 9th. c., when emigrants from Norway settled here. The Landnama Book, however, one of the earliest records of the island, states that the Christian relics found here by the Norwegians on their arrival—as wooden crosses, etc.—had been erected (previously by Irish settlers. However this may be, it is certain that the first authentic successful settlement of I. was made under Ingolf, a Norwegian, who after a fruitless attempt on the s. coast 870, succeeded in establishing himself at Reykiavik 874. The changes introduced in Norway by Harald Haarfager caused many who could not endure them to betake themselves to other countries and particularly to I., all the habitable coast districts of which were occupied within 60 years, and the old

Norwegian institutions were transferred to it unmodified. The government was at first, in the times of paganism, hierarchic and aristocratic; it became afterward a kind of aristocratic republic. The Althing met every summer in the valley of Thingvalla. Christianity was not established by law till A.D. 1000, and then not without much opposition. Schools were then founded, and two bishoprics in Holar and Skalholt.

The Icelanders were enterprising sailors in the early periods of their history, and discovered Greenland about 982, and a part of the American coast, which they called *Vineland,* about 990. They made voyages also to the south, visiting the furthest parts of the Mediterranean. The most flourishing period of Icelandic literature and commerce was from the middle of the 12th to the beginning of the 13th c., when, in consequence of domestic broils, Haco V. of Norway succeeded in reducing the whole island under his sway (1262), and a declension began, which continued till a new impulse was given to the minds of men, here as elsewhere, by the Reformation. When Norway was united to Denmark 1380, I. shared its fate, but was not transferred with Norway to a new allegiance in 1814. The Prot. religion was introduced 1540, but not fully established till 1551. In the 17th c., the island suffered much from the ravages of Algerine pirates, who carried away many persons to slavery. In 1707, small-pox carried off 18,000 persons; and 1784–5, about 9,000 died of famine.—The Althing, after it had subsisted for fully 900 years, was suppressed in the 19th c., but was reorganized 1843. By the new constitution for Iceland 1874, Jan., the Althing has obtained legislative powers in all matters concerning Iceland.—See Von Troil, *Letters on Iceland,* 1772; Sir George Mackenzie, *Travels in Iceland,* 1810; Henderson, *Journal of a Residence in Iceland,* 1818; C. S. Forbes, *Iceland, its Volcanoes, Geysers, and Glaciers,* 1860; S. Baring-Gould, *Iceland, its Scenes and Sagas,* 1863; Capt. Richard F. Burton, *Ultima Thule: a Summer in Iceland,* 1875.

ICELANDER, n. *īs'lănd-ėr:* a native of Iceland. ICELAND'IC, a. *-lănd'ĭk,* of or belonging to: N. the language of the Icelanders; the old Norse language.

ICE'LAND MOSS (*Cetraria Islandica*): lichen found in all the northern parts of the world, and valuable for nutritious and medicinal properties. It is collected as an article of commerce in Norway and Iceland. In far northern regions, it grows even near the level of the sea; in more southern countries, it is found on mountains. It is common in the mountainous parts of Britain, though not turned to any economic account. In Carniola, it is used for fattening cattle and pigs. It grows in extreme abundance in Iceland on tracts otherwise desert; and numerous parties migrate from great distances with horses, tents, and provisions, in the summer months, for the sole purpose of gathering it, as an article of commerce and for food. In many places, this lichen thickly covers the whole surface of the ground, growing about 1½–4 inches high; and consisting of an almost erect *Thallus* (q.v.). It is of a leathery and somewhat cartilaginous substance. When I. M. is used as an article of food, its bitterness is first partially removed by steeping in water, after which, in Iceland and other northern countries, it is sometimes pounded and made into bread; or it is prepared by boiling, the first water being rejected. It is often boiled with milk, making a kind of jelly, either with milk or water. It is a nutritious food, and suitable for invalids, but is not in great request except in times of scarcity. It contains about 80 per cent. of a kind of starch called *Lichen Starch*, or *Lichenin*, and owes its bitterness to an acid principle, *Cetraric Acid.*—An allied species, *Cetraria nivalis*, growing in northern countries, possesses similar properties. It is very abundant in some parts of Iceland, where it is called *Mary's Grass*, and is used, though not habitually, for food.



Iceland Moss (*Cetraria Islandica*).

ICELAND-SPAR: variety of calcareous spar, remarkable for its transparency and double refraction: the best specimens are obtained from Iceland.

ICE PLANT (*Mesembryanthemum* [q.v.] *crystallinum*): annual herbaceous plant, native of Africa and s. Europe, remarkable for the watery vesicles (*papulæ*) with which its whole surface is covered, which have the appearance of granules of ice, and sparkle in the same manner in the sun. This interesting peculiarity makes it common as a tender annual in green houses. The seeds are used for food in the Madeira Islands. The ashes supply barilla, and the plant is burned on this account in countries where it abounds.

ICH DIEN, *ĭch dēn* [Bav. I serve]: the motto of the Prince of Wales, originally taken by Edward the Black Prince from the conquered king of Bohemia. *Note.*—On the other hand, it is suggested, the motto might have arisen from the circumstance that after Edward I. conquered Wales, his queen was confined of a son in Caernarvon, who was therefore a Welshman by birth. The fact of the birth was announced by a herald in the Welsh words, *eich dyn*, signifying 'your man,' or 'behold your man.'—Dr. C. Mackay. This, however, may be nothing more than a curious coincidence.

ICHNEUMON, n. *ĭk-nū′mŏn* [L. and Gr.—from Gr. *ichneuō*, I follow the steps]: a sort of ferret or civet inhabiting Egypt, which tracks or hunts after the eggs of the crocodile, and feeds on them: see ICHNEUMON (*Herpestes*) below. **ICHNEUMONIDAN**, a. *ĭk′nū-mŏn′ĭ-dăn*, relating to the ICH′NEUMON′IDÆ, *-dē*, a family of predaceous insects having the ichneumon-fly as its type. **ICHNEUMON-FLY**, general name for parasitic insects which destroy caterpillars and other insects: see ICHNEUMON (insect) below.

ICHNEU′MON (*Herpestes*): genus of digitigrade carnivorous quadrupeds of the family *Viverridæ* (q.v.), having a much elongated body, small head, sharp muzzle, rounded ears, and short legs. The species, which are numerous, are natives of Africa and warm parts of Asia. One, the ANDALUSIAN I. (*H. Widdringtonii*), occurs in the s. of Spain. They feed on small quadrupeds, reptiles, eggs, and insects. Some of them, particularly the EGYPTIAN I. (*H. Ichneumon*) and the MANGOUSTE, MUNGUS, or MONGOOSE (*H. griseus*) of India, have been greatly celebrated as destroyers of serpents and other noxious reptiles, many wonderful fables being related on this subject. The Egyptian I., the I. of the ancients, is larger than a cat, gray, with black paws and muzzle, and a black tuft of diverging hairs at the end of the tail. It abounds in Lower Egypt, but in Upper Egypt it is comparatively rare. It often enters houses, and devours poultry and their eggs. With noiseless gliding motion it advances on serpents until it can suddenly seize them from behind the head, where its long sharp teeth inflict a fatal wound. It scratches up the sand for the eggs of crocodiles, which it eats with great avidity. It was a sacred animal among the ancient Egyptians; the killing of it was forbidden; and individuals, for the maintenance of which funds were set apart, were objects of worship. The I. is easily domesticated, and forms a cat-like attachment to the place of its residence. It is useful in keeping houses free of rats and other vermin. It is therefore frequently domesticated in Egypt, as the mangouste also is in India. This species is rather smaller, of a lighter color, and has a pointed tail.

Egyptian Ichneumon (*Herpestes Ichneumon*).

ICHNEU'MON: Linnæan genus of insects, now constituting a family or tribe, *Ichneumonidæ*, of the order *Hymenoptera*, section *Terebrantia*. The *Ichneumonidæ* are extremely numerous. Gravenhorst's *Ichneumonologia Europæa* describes nearly 1,650 European species, and they are equally abundant in other parts of the world. Many are minute, others are large; a few of the tropical species are among the largest of insects. They have the abdomen united to the thorax by a pedicle, often very slender. The abdomen itself is slender, and the whole form attenuated. The antennæ are generally thread-like, composed of a great number of joints, and are kept in constant vibration. The ovipositor in some is short; in some it is very long, much longer than the body of the insect, and inclosed in a kind of sheath formed of two parts, concave on their inner surface, from which it is disengaged when about to be used, the whole then often seeming as three threads proceeding from the extremity of the abdomen. All the *Ichneumonidæ* deposit their eggs either in or on—generally in—the bodies, eggs, or larvæ of insects, or in spiders. Some deposit their eggs in aphides. They are thus extremely useful to the farmer and gardener, who except for their aid would often scarcely be able to defend his crop from his minute insect foes. Particular species of *Ichneumonidæ* are the natural enemies of particular kinds of other insects. Thus, *Microgaster glomeratus* and *Pimpla instigator* lay their eggs in the caterpillars of the cabbage butterfly. Some species deposit only one egg in the egg or larva which is destined to afford food to their own larva; others deposit a number of eggs together. Those which have a long ovipositor use it to reach eggs or larvæ under the bark of trees, in holes of wood, etc. The I. larvæ generally consume only the fat of the larva on which they feed, which continues to subsist and so to sustain them until they are ready for transformation into pupæ. In their perfect state, the *Ichneumonidæ* feed only on the juices of flowers. They are often seen flying about umbelliferous flowers. The I. larvæ are without feet. The pupæ of many are inclosed in silken cocoons.

ICHNITES, n. plu. *ĭk'nīts* [Gr. *ichnos*, a footprint]: in *geol.*, a term applied to all fossil footprints. **ICH'NOLITE**, n. *-no-līt* [Gr. *ichnos*, a footprint; *lithos*, a stone]: in *geol. and paleon.*, stone on which an ichnite or footprint of a fossil animal or bird is impressed.

ICHNOGRAPHY, n. *ĭk-nŏg'ră-fĭ* [Gr. *ichnos*, a footprint; *grăphō*, I describe]: a description of the ground-plan of a building; a horizontal section of a building or other object. **ICH'NOGRAPH'IC**, a. *-nō-grăf'ĭk*, pertaining to; describing a ground-plot: also **ICH'NOGRAPH'ICAL**, a. *-ĭ-kăl.*

ICHNOLOGY, n. *ĭk-nŏl'o-jĭ* [Gr. *ichnos*, a footprint; *logos*, discourse]: in *geol.*, the principles and details in the investigation of the footprints or tracks of certain animals, or of the impressions made by meteoric or other transient physical forces, left on mud or sand now hardened into strata of rock: called also ICHNOLITHOLOGY, n. *ĭk'nō-lĭth-ŏl'ŏ-jĭ* [Gr. *lithos*, a stone; *logos*. discourse]. It is a section of the science of Paleontology. The actual remains of the hard portions of the animals themselves are the materials on which chiefly rests our knowledge of the former inhabitants of the globe; but of many animals we know nothing more than the more or less distinct impressions made by them as they moved over the surface of a muddy shore. And in some beds, not only is the evidence of the shore-wave preserved in the ripple mark, and the influence of the sun's heat exhibited in the superficial cracks, but frequently the passing hail-storm, or the sudden and heavy thunder-shower, has left its impress upon them, and this so perfectly, that it is not difficult to determine, from the form of the cup-like depression, whether or not the rain was accompanied by a breeze, for, by observing the amount of difference in the sides of the cup, and the position of the highest side, the direction of the gale and its velocity may be approximately determined. Though the force or the body forming the impression has been removed immediately after it has made the pressure, yet in these prints the evidences of animal life and of the activity of physical forces, have come down to us from the remotest periods. The impressions occur almost invariably on rocks that have been deposited as mud; only in a few cases have they been noticed in sandstone. Sometimes the argillaceous deposit is a thin layer between two sandstone beds; it is then difficult to obtain a clear surface in the shale; but the details are carefully preserved in relief in the natural cast on the under surface of the superimposed sandstone.

The necessary conditions for the preservation of footprints seem to be either of the following. The silt-bed may have formed an extensive flat shore, uncovered by the tide at each ebbing. Whatever impressions were made on this plastic surface would be baked and hardened by the influence of the sun, if it remained for a sufficient time uncovered by the water; and when the tide again flowed, the hardened mud, resisting its influence, would receive another film of sediment, which would specially deposit itself in the depressions, and thus secure the permanence of the impressions. These influences would operate more powerfully on portions of the shore which were under water only at spring-tides. The impressions of numerous wading birds are preserved in this manner at the present day, on the plastic mud which covers the flat shore of the Bay of Fundy, where the tide rises, it is said, sometimes as much as 70 ft. Both Gould and Lyell have given detailed accounts of the process as it goes on there. The other method is one independent of the sun's influence, where, on an ordinary muddy shore during the recession of the tide, the depressions are filled up by blown sand, and the tide, on its return, flows over a level surface, on which it deposits a fresh layer of silt.

The study of ichnology carries us back to the remotest known period of animal life on the globe. The deposit from which has been obtained the fragment of the oldest known trilobite (Palæopyge), contains the borings of certain worms (fig. 1) and impressions of rain-drops. In strata of the same period, but a little later, series of regularly recurring groups of markings are considered by Salter as having been produced by the sharp claws of crustacea in walking; while other sets he refers, with considerable probability, to the strokes of the bifurcate tail of an unknown crustacean as it swam through shallow water. From the American representatives of the same rocks (Potsdam sandstones), Prof. Owen has described a number of impressions made apparently by different animals, to which he has given the generic name of Protichnites. The slabs show that the animals made at each step 14, 16, or more impressions. They were probably crustacea, furnished with three or four pairs of bifurcating limbs, like the modern king-crab. Similar impressions have been observed in the Lower Silurian rocks of Eskdale in Scotland, and have been named *P. Scoticus.* The tracks of numerous annelids also occur in these rocks. They exhibit the impressions of the creatures as they moved along, or sometimes through, the soft mud, and they frequently terminate in a distinct impression of the form of the worm itself, produced perhaps by the dead body, though no trace of the body itself is preserved (fig. 2). The footprints of a small reptile had been observed on the sandstone of a quarry near Elgin, Scotland, which probably belongs to the Old Red Sandstone Measures. In 1851, it was discovered that they were produced by a little reptile (*Telerpeton Elginense*), whose remains were there found. And more recently, Prof. Huxley has referred a different set of impressions to the remarkable fish-like reptile, Stagonolepis, which he describes. The Coal Measures of Britain and of Germany have disclosed the footprints of different reptiles.

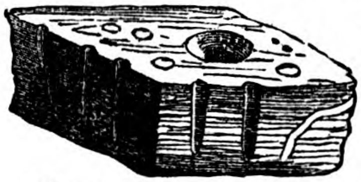


Fig. 1.—Annelid Borings (Arenicolites): From Cambrian Rocks.

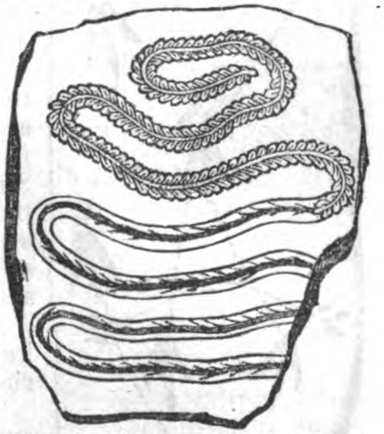


Fig. 2.—Nereites Cambrensis: From the lower Silurian Shales of Moffat.

The New Red Sandstone strata abound in footprints. It was the Permian or lower division of this series that supplied, 1828, the impressions which gave the first indication of animal life from such evidences to the mind of Dr. Duncan. The tracks that he described occur on the layers of unctuous clay which separate the beds of sandstone in the quarries at Corncockle, Dumfriesshire; they frequently are clear and delicate, as at the moment when they were impressed, and are repeated bed after bed on the fresh tablets as they were prepared for their reception. From their number and direction, they seem to be the tracks of animals passing together across an estuary from which the tide had receded, to some frequented ground periodically sought for food or pleasure. No animal remains have been found associated with them; they seem, however, to belong to forms of tortoise. The slab figured is a portion of the track probably of a long-tailed Chelonian, with a stride a little over six inches. The pad of the foot was soft and smooth; the light impressions of the fore-foot were nearly obliterated by the hind-foot, which was furnished with four claws (fig. 3). Sir William Jardine, on whose property the Corncockle quarries are, has made these tracks the subject of a valuable and elaborate monograph.

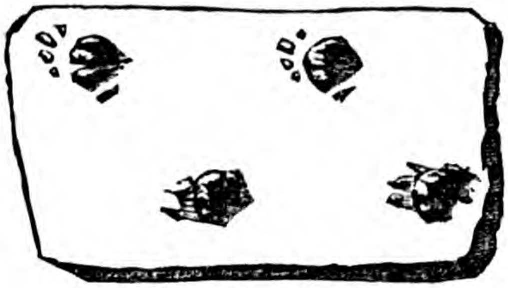


Fig. 3.—Footprints of a Tortoise:
From the Permian Sandstone of Annandale.

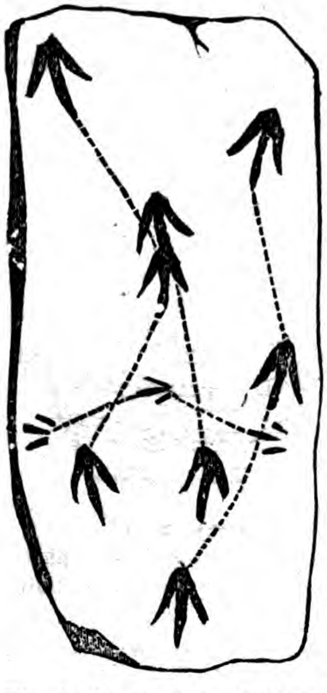


Fig. 4.—Footprints of Birds: On the Oolitic Sandstones of Connecticut.

In the Triassic rocks, the well-known foot-tracks of the Labyrinthodon (q.v.) occur.

The earliest evidence of the existence of birds are the traces of their feet in the argillaceous sandstones of the valley of the Connecticut, now known to be of the Lower Oolitic age. The structure of the tridactyle feet which produced these impressions shows the regular progression in the number of the toe-joints from the innermost to the outermost toe peculiar to birds, and they must be taken as evidencing the occurrence thus early of the class, though a considerable interval elapses before the first true fossil of a bird occurs; viz., the archæopteryx. Pres. Edward Hitchcock of Amherst College, showed that a majority of the tracks ascribed to birds, were really those of a great batrachian. His report, published by the state of Massachusetts, 1836, gives 38 places in which he had found ichnolites, with the footprints of 119 species of animals—quadrupeds, birds, crustaceans, tortoises, saurians, batrachians, insects, etc. In the Amherst College museum is the collection of Connecticut valley ichnolites, showing more than 8,000 distinct tracks. Similar tracks have been found in the same formation in N. J. The tracks of several species of Odontornithes (q.v.), toothed birds of Kansas, were described by Prof. Marsh 1880. Immense tridactyle footprints have been known for many years in rocks of Wealden age in the s.e. of England. At first, they were supposed to be birds; but examination has shown them to belong to reptiles; and the discovery in the same strata of the perfect foot of a young iguanodon, measuring 21 inches in length, and furnished with three toes, which would form a print precisely similar to the tracks so long known, shows them to have been certainly produced by the Iguanodon (q.v.).

ICHOR, n. *ī'kŏr* [Gr. *ichōr*, matter, gore]: the supposed colorless blood of the heathen deities; a thin watery humor like whey flowing from an ulcer. Ichorous, a. *ī'kō-rŭs*, like ichor; watery; serous.

ICHORHÆMIA, n. *ī-kŏr-hē'mĭ-a* [Gr. *ichōr; haima*, blood]: in *pathol.*, same as Pyæmia (q.v.).

ICHTHELIS, n. *ĭk'thĕ-lĭs* [Gr. *ichthus*, a fish; *helios*, the sun]: typical genus of the sub-family *Ichthelinæ*, and the family *Ichthelidæ*, the sun fishes of Jordan, a family of Acanthopteri.

ICHTHYIC, a. *ĭk'thĭ-ĭk* [Gr. *ichthus*, a fish]: relating to fishes. Ich'thyocol, n. *-ō-kŏl*, or Ich'thyocol'la, n. *-kŏl'lă* [Gr. *kolla*, glue]: fish-glue; isinglass. Ich'thyocop'rus, n. *-kŏp'rŭs* [Gr. *kopros*, dung], also Ich'thyocop'rolite, n. *-kŏp'rō-līt* [Gr. *kopros*, dung; *lithos*, a stone]: the fossil dung of fishes. Ich'thyodor'ulite, n. *-dŏr'ū līt* [Gr. *doru*, a spear; *lithos*, a stone]: fossil fin-spine of a fish: see below. Ich'thyog'raphy, n. *-ŏg'ră-fĭ* [Gr. *graphō*, I write]: a treatise on fishes.

ICHTHYODOR'ULITE [Gr. fish-spear-stone]: fossil fin-spine of a fish, such as are found in the stratified rocks. Plagiostomous fishes have their dorsal fin furnished in front with a strong bony spine. The fin is connected with the spine, and is elevated and depressed by its movement. It seems also to be employed by the fish as a defense against its larger foes. Some bony fishes have similar spines, as the Sticklebacks, Silurids, etc. The spines are most frequently unassociated with any fish remains, having belonged to plagiostomous fish, in which the spine is simply implanted in the flesh, and consequently would be speedily separated from the body of the fish when it began to decompose.

The earliest certain evidence of vertebrate animals is the spines of plagiostomous cartilaginous fishes in the bone bed of the Ludlow rocks, the uppermost of the Silurian deposits. Spines belonging apparently to three species have been found; they are small, compressed, slightly curved, and finely grooved lengthwise, and belong to the genus Onchus. With them have been found petrified portions of tubercular and prickly skin, like the shagreen of the shark. The Old Red Sandstone has supplied such a variety of spines as to have afforded the materials for establishing 14 genera; and in the Coal Measures they are more numerous, belonging to no less than 21 genera.

ICHTHYOID, a. *ĭk'thĭ-oyd* [Gr. *ichthus*, a fish; *eidos*, likeness]: resembling a fish. ICHTHYOL, bituminous mineral found in the fossiliferous rocks of the Tyrol, having sulphur as its chief ingredient, probably a residue from the bodies of fishes. By distillation the oil of ichthyol is separated from the tarry matter, and is used as remedy for diseases of the skin. ICH'THYOLITE, n. *-ō-līt* [Gr. *lithos*, a stone]: a fossil fish, or any portion of a fish, as a scale, a tooth, a spine, etc. ICH'THYOL'OGY, n. *-ŏl'ŏ-jĭ* [Gr. *logos*, a discourse]: branch of zoology which treats of the structure, the classification, the habits, and the history of fishes: see below. ICH'THYOLOG'ICAL, a. *-lŏj'ĭ-kăl*, pertaining to. ICH'THYOL'OGIST, n. *-jĭst*, one versed in. ICH'THYOMAN'CY, n. *-măn'sĭ* [Gr. *manteia*, divination]: divination by the entrails, etc., of fishes.

ICHTHYOL'OGY: branch of natural science which treats of fishes. Aristotle is the most ancient author having any claim to be noticed in a history of I.: this science was little cultivated by any other of the ancients. In modern times, it began to be cultivated, about the middle of the 16th c., by Belon, Rondelet, and Salviani. Toward the close of the 17th c., it made great progress through the labors of Willoughby and Ray; in the 18th c., through those of Artedi, Klein, Linné, Gronow, Brunich, Scopoli, and Bloch; in the beginning of the 19th c., through those of Cuvier and De la Cépède; while, more recently, Valenciennes, Müller, Agassiz, and Owen are eminent among many who have prosecuted the study with ardor and success. Yarrell produced an excellent work on British Fishes. The earlier ichthyologists generally included the *Cetacea* among fishes. Linné (Linnæus) removed the *Cetacea* to their proper place. His system of I. is almost as artificial as his system of botany. It is founded on the relative positions of the pectoral and ventral fins, without reference to any important point of comparative anatomy or animal economy. Cuvier's classification (see FISHES) shows an enormous advance in naturalness and in scientific accuracy. The system of Agassiz, founded on the external covering of fishes (Placoids, Ganoids, Ctenoids, Cycloids), is also highly artificial, though found convenient for fossil ichthyology. Johannes Müller made many important modifications of the Cuvierian system; and the latest researches seem to show that, with further corrections and extensions, the system aimed at by him is really a natural one. See Günther's *Introduction to the Study of Fishes* (1880). See FISHES: VERTEBRATA.

ICHTHYOMORPHA, n. *ĭk′thĭ-ō-mŏr′fă* [Gr. *ichthus*, a fish; *morphē*, form, shape]: an ord. of Amphibians, also called *Urŏdēlă*, comprising the fish-like newts, and others.

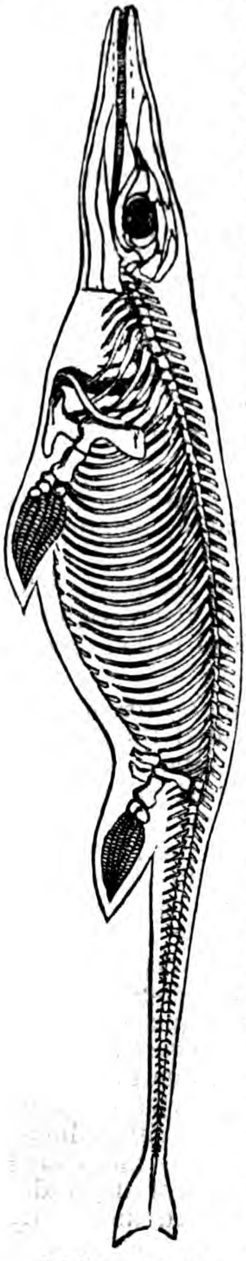
ICHTHYOPATOLITES, n. plu. *ĭk′thĭ-ō-păt′ō-līts* [Gr. *ichthus*, a fish; *patos*, a footpath; *lithos*, a stone]: in *geol.*. fish-tracks, or the imprints of the pectoral fin-rays of certain fishes. **Ich′thyoph′agist**, n. *-ŏf′ă-jĭst* [Gr. *phagō*, I eat]: one who eats or lives on fish. **Ich′thyoph′agous**, a. *-gŭs*, fish eating. **Ich′thyoph′agy**, n. *-jĭ*, fish diet or eating.

ICHTHYOPHTHALMITE, n. *ĭk′thĭ-ŏf′thăl-mīt* [Gr. *ichthus*, a fish; *ophthalmos*, the eye]: fish-eye-stone; a variety of pyramidal zeolite, having a peculiar pearly lustre. **Ich′thyopteryg′ia**, n. *-ŏp-tėr-ĭj′ĭ-ă* [Gr. *pterux*, a wing or fin]: an order of reptiles, living and extinct, having limbs formed for swimming like fins.

ICHTHYOPHTHIRA, n. *ĭk′thĭ-ŏf-thī′ră* [Gr. *ichthus*, a fish; *phtheir*, a louse]: an order of crustacea, comprising animals parasitic upon fishes.

ICHTHYOPSIDA, n. *ĭk′thĭ-ŏp′sĭ-dă* [Gr. *ichthus*, a fish; *opsis*, appearance]: the primary division of the Vertebrata comprising the Fishes and Amphibia, also called *Branchiate Vertebrata*.

ICHTHYOSAU′RUS [Gr. *ichthus*, fish; *sauros*, lizard]: remarkable genus of reptiles which inhabited the sea during the deposition of the Secondary strata. Like the modern Cetacea, their structure was modified to suit their aquatic life. The body was shaped like that of a fish, the limbs were developed into paddles, and the tail, long and lizard-like, was furnished, it is believed, with a fleshy fin, as in the dolphin, except that its position was vertical. The head was large, and produced into a long and pointed snout, resembling that of the crocodile, except that the orbit was much larger, and had the nostril placed close to it, as in the whale, and not near the end of the snout. The jaws were furnished with a large series of powerful conical teeth, lodged close together in a continuous groove, in which the divisions for sockets, which exist in the crocodile, were indicated by the vertical ridges on the maxillary bone. The teeth were hollow at the root, sheathing the young teeth, which gradually absorbed the base of the older ones, and, as they grew, pressed them forward and finally displaced them. The long and slender jaws were strengthened to resist any sudden shock by being formed of many thin bony plates, which produced light and elastic as well as strong jaws. The most remarkable feature in the head was the eye, which was not only very large—in some specimens measuring 13 inches in diameter—but was specially fitted to accommodate itself for vision in air or water, as well as for speedily altering the focal distance while pursuing its prey. The structure, which thus fitted the eye so remarkably to the wants of the animal, consisted of a circle of 13 or more overlapping sclerotic bony plates surrounding the pupil, as in birds. This circle acted as a sort of self-adjusting telescope, and accompanied by the extraordinary amount of light admitted by the large pupil, enabled the I. to discover its prey at great or little distances in the obscurity of the night, and in the depths of the sea. The neck was so short that the body was probably not in the least constricted behind the head. The backbone was fish-like; each joint had both its surfaces hollow, making the whole column very flexible. The small size of the paddles compared with the body, and the stiffness of the short neck, seem to suggest that the tail must have been an important organ of motion. Prof. Owen is satisfied that it was furnished with a vertical tail, because the vertebræ are compressed vertically, and also because the tail is frequently found disarticulated a short distance from its extremity, as if the weight of the upright tail had caused it to fall when the animal had begun to decompose. The fish-like body, the four paddles, and especially the powerful tail, would make the ichthyosauri active in their movements; and consequently, with their predaceous habits, very dangerous enemies to the other animals that inhabited with them the Secondary seas. That their principal food consisted of fishes, is evident from the masses of broken bones and scales of contemporary fishes that have been found under their ribs in the place where the stomach of the animal was situated.



Ichthyosaurus.

The remains of ichthyosauri are peculiar to the Secondary strata, occurring in the various members of the series from the Lower Lias to the Chalk, but having their greatest development in the Lias and Oolite. More than 30 species have been discovered; they differ from each other chiefly in the form of the head, some having a long and slender snout, like the gavial of the Ganges, while others had short and broad heads, more like the common crocodile. The great repository for ichthyosaurian remains hitherto has been the Lias at Lyme Regis, England. They are found also in rocks of the same period in France and Germany; and Prof. Marsh of Yale Univ. described (1877) portions of a saurian skeleton found in the Rocky Mountains resembling that of the I.: no remains of the true I. have been found in America.

ICHTHYOSIS, n. *ĭk'thĭ-ō'sĭs* [Gr. *ichthus*, a fish]: fish-skin disease; characterized by a hardened, thickened, rough, and almost horny state of the cuticle, which breaks into small, irregular, scale-like pieces, which do not readily exfoliate, but which, if removed, are speedily reproduced. The disease may affect almost the whole surface, or may be confined to a single part; and is frequently, but not always, congenital. It is attended with no constitutional disturbance, and the general health is often very good. The desease is, however, extremely obstinate, and when congenital, may be considered as incurable.

The treatment consists in the frequent use of the warm or vapor bath, so as to soften the thickened epidermis and to facilitate its removal, and friction by means of a piece of flannel may be conjoined with the bath. The employment of sulphureous baths has occasionally been found of temporary use; and the internal administration of tar, cod-liver oil, etc., sometimes gives relief.

ICHTHYOTOMIST, n. *ĭk-thĭ-ŏt'ŏ-mĭst* [Gr. *tŏmē*, a cutting]: one engaged in the dissection of fishes

ICHTHYPHALLIC, a. *ĭk'thĭ-făl'lĭk* [Gr. *ichthus*, a fish, and *phallus*, which see]: pertaining to *ich'thyphal'lus*, or fishgod worship of the anc. Egyptians.

ICHTHYS, n. *ĭk'thĭs* [Gr. a fish]: a word found on many articles, as rings, seals tombstones, etc., belonging to the early years of Christianity, during the struggle against paganism. It is supposed to have had a mystical meaning, from the fact that the several characters are the initial letters of the Greek words *Iēsous Christos, Theou Huios, Sōtēr*, 'Jesus Christ, the Son of God, the Savior.' It was thus, in days of persecution, a concealed confession of faith in Christ. It may have been suggested by the fact that some of the apostles were fishermen.

ICICA, *ī'sĭ-ka* or *ĭs'ĭ-ka:* genus of trees of nat. ord. *Amyridaceæ*, having pinnate leaves with an odd terminal leaflet, and white flowers in panicled racemes: the flowers having a small 5-toothed calyx, 5 petals, 10 stamens, and a cup-shaped disk with 10 crenatures on the margin, the fruit a drupe.—*I. icicariba* yields the American Elemi (q.v.).—*I. heterophylla*, a tree of Guiana, yields a yellow aromatic balsam, which long retains its fluidity, and is used as an application to wounds. The resinous seeds are very fragrant.—*I. heptaphylla* and *I. Guianensis*, also natives of Guiana, yield very fragrant balsams, which harden into a gray resin, used as incense in churches and for other purposes, and esteemed as a medicine in dysentery.—*I. altissima* is a tree 100 ft. high, native of Guiana, of which the wood is known as *White Cedar* and *Red Cedar*, and as *Acuyori, Samaria, Mara,* and *Curana Wood;* it is used for furniture and house-carpentry, and for canoes.

ICICLE, ICING, ICY: see ICE. ICICLES, in *her.*, are charges of the same shape as drops in the bearing called

Gutté q.v.), but reversed; called also Clubs, Locks of Hair, and Guttés reversed.

ICILIUS, *ī-sĭl'ĭ-ŭs:* plebeian family in Rome, which produced some of the most zealous defenders of the plebeian interest against the patricians. The name of one of them is associated with one of the most touching incidents in the legendary history of Rome: see APPIUS CLAUDIUS.

ICO, *ē'kō:* town of Brazil, province of Ceara, on the Salgado, 210 m. n.w. of Parahiba. The people mostly are shopkeepers, who supply the interior with articles of European manufacture, receiving produce in return, which they send down to the coast. Pop. 6,000.

ICOD, *ē-kŏd'*, or ICOD DE LOS VINOS, *ēkŏd' dā lōs vēn'yōs:* small town on the n.w. coast of Tenerife, one of the Canaries (q.v.). Pop. about 5,500.

ICOLMKILL': see IONA.

ICO'NIUM: see KONIEH.

ICONOCLAST, n. *ī-kŏn'ŏ-klăst* [Gr. *eikon*, an images *klastēs*, a breaker—from *klăō*, I break]: breaker or destroyer of images used in worship; a name given first in the 8th century to those who destroyed the images in churches, or who were opposed to rendering religious reverence to statues, pictures, and other sensible representations of sacred things. I'CONOCLAS'TIC, a. *-tĭk*, breaking images. ICONOCLASM, n. *-klăzm*, the act of.—The iconoclast movement had its commencement in the Eastern Church. Opinion is divided as to the origin and antiquity of the practice of Image-worship (q.v.) in the church; but it is certain that in the 6th and 7th c. it prevailed extensively, especially in the Eastern Empire, and that practices of it in some churches were a source of much suspicion and offense. Many bishops interposed to correct these abuses; but the iconoclast movement, strictly so called, began with the imperial edict issued 726 by Emperor Leo III., surnamed the Isaurian, forbidding the honors paid to sacred images, and even commanding the removal from the churches of all images, that of our Lord alone excepted, This was followed by another decree 730, which prohibited, under pain of death, as sinful and idolatrous, all acts of reverence, public or private, to images, and directed that, wherever such images should be found, they should forthwith be removed or destroyed. The attempt to enforce this decree occasioned great agitation, especially in the Greek islands and in Italy. The popes Gregory II. and Gregory III. protested vehemently against it, repudiated the imputation of idolatry, and explained the nature of the honors to images for which they contended. Leo persevered, nevertheless, in his opposition, which was continued by his successor, Constantine, surnamed Copronymus. Under this emperor, a council was held in Constantinople 754, in which the inconoclast decrees were affirmed in their fullest extent; and Constantine's son, Leo IV., renewed, on his accession 775, the enactments of his predecessors. Under the widow of Leo, Empress Irene, a council was held at Nice, 786 (see IMAGE-WORSHIP), in which these proceedings were condemned and revoked; but succeeding emperors, Nicephorus (802–811), Leo the Armenian (813-820), Michael the Stammerer, and Theophilus, returned with greater or less severity to the policy of the iconoclast emperors. As regards the Greek Church, the controversy may be said to have been finally settled under Empress Theodora in a council held at Constantinople 840, or at least by a subsequent one of 870. The modern usage of the Greek Church permits pictures, but rejects graven or sculptured representations of sacred objects. Except in Italy, the iconoclast controversy created but little sensation in the Western Church until the movement in the time of Charlemagne and his successors: see IMAGE-WORSHIP.—In the modern church, the popular violences directed in Switzerland, Great Britain, and some parts of Germany, against crucifixes, images of saints, and other objects associated with what has been stigmatized as the idolatry of Rome, have sometimes been described under the name of Iconoclasm.

ICONOGRAPHY, n. *ī'kŏn-ŏg'ră fĭ* [Gr. *eikon*, an image; *graphō*, I describe]: the description of anc. images or statues; the art exercised by the image-makers of all ages of expressing in sculpture, carving, and painting, actual persons and events, or abstract and spiritual notions—see Fairholt's Terms in Art.

ICONOLATOR, n. *ī'kŏn-ŏl'ă-tėr* [Gr. *eikon*, an image; *latreia*, religious service—from *latris*, a servant]: one who worships images. I'CONOL'ATRY, n. *-trĭ*, the worship of images. I'CONOL'OGY, n. *-ŏ-jĭ* [Gr. *logos*, a discourse]: the doctrine of images or emblematical representations; a description of pictures or statues.

ICONOMACHY, n. *ī'kŏn-ŏm'ă-kĭ* [Gr. *eikon*, an image; *machē*, a fight]: strong hostility to images and pictures as objects of worship or reverence.

ICONOPHILIST, n. *ī-kon-ŏf'ĭl-ĭst* [Gr. *eikōn*, an image; *phileō*, I love]: a connoisseur of pictures or gems; a collector or judge of prints.

ICOSAHEDRON, n. *ī'kŏs-ă-hē'drŏn* [Gr. *eikŏsĭ*, twenty; *hĕdră*, a seat, a basis]: a solid of twenty sides. I'COSAHE'DRAL, a. *-drăl*, having twenty sides. ICOSANDRIAN, a. *ī'kŏs-ăn'drĭ-ăn*, or I'COSAN'DROUS, a. *-drŭs* [Gr. *anēr*, or *andra*, a male]: in *bot.*, having twenty or more stamens inserted on the calyx.

ICTERIC, a. *ĭk-tĕr'ĭk*, or ICTER'ICAL, a. *-ĭ-kăl* [L. *ictĕrŭs*, jaundice: F. *ictère*]: affected with jaundice; good in the cure of the jaundice. ICTERUS, n. *ĭk'tĕr-ŭs*, jaundice.

ICTERINÆ, n. *ĭk-tėr-ī'nē* [L. *icterus*]: hangnests; typical sub-family of the family *Icteridæ*, the orioles, a family of *Passeres*, insessorial birds.

ICTUS, n. *ĭk'tŭs* [L.]: a blow; a stroke, as *ictus solis*, sunstroke; cadence, emphasis; stress on an accented syllable.

ICY: see under ICE.

I'CY CAPE: a headland of N. America, lat. 71° n, about the middle of that long reach of the arctic coast between Cape Lisburne on the s.w,, and Cape North or Point Barrow on the n.e. It was discovered by Cook 1778, and was his furthest point n. of Behring's Strait.

ID., adv. *ĭd:* a contraction for idem (q v.).

I'D: contr. for *I would* or *I should*. *I had* was formerly but erroneously regarded as the full spelling of the contr. I'd.

IDA, *ī'da:* high mountain range, in Asia Minor, extending from Phrygia through Mysia into Troas. The city of Troy was at its base. It is the scene of many ancient legends. The s. part of the range was called Gargarus, the highest peak of which is about 4,700 ft. above the sea. Here was a temple of Cybele, who therefore was called the *Idæan Mother*. From Ida flow several famous streams, as the Granicus, Simois, and Scamander,—Another Ida is in Crete, extending from w. to e., now called Psiloriti: here Zeus was said to have been educated.

IDÆAN, a. *ĭ-dē'an* [L. *Idæus*]: of or pertaining to Mount Ida, in Crete.

ĪDAHŌ, *ī'da-hō:* one of the territories of the United States, bounded n. by Canada, e. by Montana and Wyoming, s. by Nevada and Utah, w. by Oregon and Washington; between lat. 42° and 49° n. and long. 111° and 117° w.; extreme length n. to s. 440 m., mean width (at parallel 44° 30′) 255 m.; area 84,800 sq. m.; acres 54,272,000; counties 16. Of its total acreage, 2,784,731 acres are within 5 Indian reservations containing (1888) 4,200 persons, viz. Cœur d'Alene 500 persons, 598,500 acres; Shoshones and Bannocks 1,700 persons, 1,202,320 acres; Nez Percé 1,227 persons, 746,651 acres; Lemhi 548 persons, 105,960 acres; and Western Shoshones 400 persons, 131,300 acres. Part of the e.s.e. section is within the Yellowstone National Park, and large tracts in the s.e. are 'sink' lands with subterranean streams. Geysers, steam and soda springs, and natural thermal baths abound, and nearly all the territory is volcanic in character.

Topography.—The surface is diversified: mountainous but with rich broad valleys in the n., basaltic in the bend of Snake river, and again mountainous, though more abrupt, with fertile valleys in the s. From the Bitter Root Mountains, which on the n.e. divide I. from Montana, extend numerous spurs westward to the Sierra Nevadas. The Bitter Root range is a portion of the Rocky Mountain system. In the central part is the Salmon range, which in general follows the course of the Salmon river. Many of the summits of these ranges and their spurs are from 8,000 to 10,000 ft. high, rugged and snow-capped. Florence is believed to have the highest elevation of any town in the United States, being 11,000 ft. above the sea and 2,000 ft. below the summit of Florence Mountain. Other mountains and peaks of note are the Kootenai, near the n. border; Cœur d'Alene, Clearwater, Weiser, Payette, Boisé, Three Buttes, Saw Tooth, Owyhee, in the s.w.; Goose Creek, and Bear River, in the s.e. corner. The territory has a superior river system. The s.e. corner is drained by Bear river into Great Salt Lake and the remainder by streams tributary to the Columbia river. Snake river or Lewis Fork of the Columbia flows nearly 1,000 m. through the w. and s., and during high water is navigable for 200 m. within the territory. It has 3 falls: the American, 60–70 ft.; Shoshone, 25–30 ft.; and Salmon, 20 ft. Its chief tributaries are the Bruneau, s., Malade, n., and the Boisé, Payette, Weiser, Salmon, Clearwater, and Palouse, e. Spokane river drains Cœur d'Alene lake and extends into Washington Terr. where it joins the Columbia river. Wood river in s. central I. drains a tract 140 m. n. to s., and 100 m. e. to w., one of the richest silver districts in the world, locally known as 'the second Leadville,' and is a clear strong current 150 ft. wide and 3 to 4 ft. deep. It has 12 tributaries, rivers and creeks, whose names have been given to notable mines. This district rises from an elevation of 5,200 ft. at Bellevue to between 8,000 and 9,000 ft. at Galena, in a stretch of 45 m. The Wood is a branch of the Snake river. The principal lakes in I. are Pend d'Oreille, Cœur d'Alene, Tessentines, Bear, Henry's, and the Payette cluster.

Climate.—The atmosphere is generally very dry. The spring, summer, and autumn months are delightful; intense cold and heavy snows prevail during the winter in the mountainous parts, but the valleys are quite equable, and cattle may winter in them without shelter. In some of the s. sections the aridity almost produces a desert, while in the n. there is usually sufficient rainfall to facilitate agricultural operations without irrigation. In the w. the temperature averages that of central Ill., Ind., and O., and in the e. it is similar to that of n. Mass., s. Vt., and N. H.

Geology.—The chief mineral productions are gold, silver, and lead, which are found in every co., and are remarkably pure. Sulphur, soda, magnesia, lime (carbonates and sulphate), and salt abound; and there are extensive veins of coal, iron, and valuable building stone. The mining of the precious metals has been retarded till within a brief period by a lack of means of transportation; but the recent extension of the railroad system has largely increased the output. From 1863 till 1880 the deposits at the mints and assay offices aggregated, gold $24,157,447, silver $727,282. In 1881, the gold yield was $1,700,000, silver $1,300,000; 1885, gold, silver, and lead $5,486,000; 1886, the same, $5,755,602; and 1887, gold $2,522,209, silver $3,422,657, lead $2,960,270; total $8,905,136. Many new and rich deposits were discovered in the Wood river dist. 1880–1, and in the Cœur d'Alene Indian reservation 1886–7. During 1887 more than 300 locations were made and recorded in the latter region, and as doubts existed as to whether the new-found mineral lands were within the limits of the reservation a resurvey of the region was urged 1888–9. I. ranks 5th among the states and territories in gold and silver production.

Agriculture.—Of the whole area, 40,000 sq. m. are said to be covered by forests, which yield black pine, and the finest white and yellow pine, spruce, fir, and cedar, some of the latter trees being 2 to 4 ft. in diameter and 50 to 60 ft. high without a limb. Useful grasses of various kinds cover 25,000 sq. m., and *artemisia* in the basaltic region, and mineral lands the remainder. While the valleys are productive in cereals, garden vegetables, and fruit, the chief agricultural importance of I. consists of its unexcelled grazing lands; and of these the white sage, greatly preferred by cattle, covers nearly 16,000,000 acres. The Mormons in the s. secure abundant crops of cereals by means of irrigation; and wheat, rye, oats, and other grains are successfully cultivated in the valleys of the lower Snake, Boisé, Clearwater, Salmon, and Spokane rivers. The aggregate products for 1885 were: wheat 1,154,000 bushels, oats 1,032,000, corn 41,000, hay 144,383 tons; 1888, wheat 2,986.280, oats 1,264,590, barley 394,690 bushels, hay 528,965 tons. The live stock 1885 comprised 22,271 milch cows, 290,131 oxen and cattle, 210,375 sheep; 1888 with values, 241,515 cattle, $3,036,234; 71,984 horses, $1,904,348; 1,603 mules, $55,343; 251,634 sheep, $389,988.

Religion.—Mormonism is the prevailing faith, probably because of the proximity of I. to Utah and the early activity of the Mormons in seeking the agricultural and mineral lands beyond the boundary. In 1885 the Mormons claimed 42 churches and 6,000 members, Rom. Cath. 7 churches, Presb. and Prot. Episc. each 4 churches, and Bapt., Meth., Episc., Univ., Lutherans, and Dunkards each one church.

Education.—The school age is from 6 to 17 years. In 1880 there were 6,758 children enrolled in the public schools. On the reorganization of the school system and the passage of the compulsory school law by the legislature 1887, a more general attention was given to this subject. As now arranged the school officers consist of a territorial supt. of public instruction, supts in each co., and a board of 3 trustees in each district. In 1888 there were 337 teachers, 268 school buildings, 365 schools, 10,433 enrolled pupils, 12 libraries, 20,130 children of school age, $164,732 received for the support of the schools from all sources, $92,910 paid teachers, and $279,500 worth of school property.

Illiteracy.—Persons 10 years old and upward enumerated (1880) 25,005, unable to read 1,384, unable to write 1,778, whites unable to write 784; foreign-born whites enumerated 6,470, unable to write 341; whites 10–14 years old enumerated 2,730, unable to write 192, males 108, females 842 whites 15–20 years old enumerated 2,728, unable to write 82, males 58, females 24; whites 21 years old and upward enumerated 16,023, unable to write 510, males 319, females 191; colored persons 10 years old and upward enumerated 3,524, unable to write 994; colored 10–14 years old enumerated 45, unable to write 14, males 8, females 6; colored 15–20 years old enumerated 191, unable to write 37, males 30, females 7; colored 21 years old and upward enumerated 3,288, unable to write 943, males 869, females 74.

Indians.—The Indians on the 5 reservations are quite advanced in civilization. An official report 1881 showed that 1,583 wore citizens' clothes, 1,094 were engaged in agricultural and 163 in other civil pursuits; 1,000,000 acres of their lands were wheat-producing; 3,172 acres were cultivated by the Nez Percés alone; the total production of the year w s 40,930 bushels of wheat, 2,500 of corn, 5,455 of barleya and 17,040 of vegetables; the Indians owned 17,000 horses,, 3,450 cattle, 800 swine, and 100 mules; they had 9 day and 2 boarding schools, attended by 595 children, with average daily attendance of 160; and the govt. gave $8,362 to support these schools during the year, and various religious societies $600.

Railroads.—There were about 250 m. of railroad in the territory 1881, and 1,000 at the close of 1888. The N. Pacific ran through the upper part, the Utah N. and Oregon Short Line through the lower, and work was being pushed on the Spokane and Palouse, Spokane and I., Cœur d'Alene, and the Oregon Railway and Navigation Company's lines.

Finances and Banking.—The assessed valuation by counties 1888 aggregated $21.288,392; the bonded debt was $200,855, and the permanent debt $146,715. There were 7 national banks (cap. $430,000), 2 territorial banks (cap. $75,000), and 11 private banks.

Government.—The govt. is the territorial form provided by congress. It comprises a gov., salary $2,600 per annum; sec., $1,800; treas., $1,000; auditor, $1,800; librarian, $250; chief justice, $3,000; 2 assoc. justices, each $3,000; terr. senators and representatives, $4 per diem and 20 cents mileage; 2 dist. attors., $250 and fees; collector of internal revenue, $2,250; 3 deputy collectors, each, $1,400–$1,600; assayer, $2,000; asst. assayer, $1,440; clerk, $1.000, asst. melter, $1,200; surveyor-gen. $2,500; chief clerk, $1,800. There are Indian agents at Fort Hall, Lemhi, and Nez Percé, and presidential post-offices at Bellevue, Boisé City, Hailey, Ketchum, and Lewiston. The cap. is Boisé City, where the U. S. govt. has a penitentiary, and the terr. a capitol building occupied 1887. An insane asylum was completed at Blackfoot, Bingham co , 1886, to which the insane of the terr. previously cared for in the Or. Insane Asylum have been removed. There are 12 terr. senators and 24 representatives, elected for 2 years each, and meeting in biennial sessions. The following is a list of the governors with their terms of service: William H. Wallace, 1863–4; Caleb Lyon, 1864–66; David W. Ballard, 1866–7; Isaac L. Gibbs, 1867–8; David W. Ballard, 1868–70; Gilman Marston, 1870–1; Thomas W. Bennett, 1871–75; Mason Brayman, 1877–8; John P. Hoyt, 1879; Mason Brayman, 1880; John P. Neil, 1880–83; John N. Irwin, 1883; William N. Bunn, 1884–5; and Edward A. Stevenson 1885–89; At the election for delegate in congress 1888 the total vote was 16,013, of which the republican candidate received 8,151, the democratic 6,404, and an independent, representing those who favored the annexation of the 4 n. counties to Washington Terr., 1,458.

Annexation and Statehood.—Since 1880 the citizens of I. have been agitated over a project for annexing the 4 n. counties to Washington Terr. to aid that terr. to become a state. A bill for the admission of Washington with that part of I. included was introduced into congress 1881, Jan., and at once aroused the strongest opposition in I. Both of the leading political parties at their terr. conventions 1888 pronounced against the threatened dismemberment and urged preliminary steps for the admission of the whole terr. as a state of the union. In his message to the legislature Dec., 1888, Gov. Stevenson recommended that provision be made for a convention that should adopt a constitution and forward it to congress with a petition for admission, without awaiting the passage of an enabling act by congress. This recommendation was adopted, and a constitutional convention assembled at Boisé City, 1889, July 4, and proceeded to draft a constitution, while conventions in the 4 ' enabled ' territories, N. Dak., S. Dak., Mont., and Washington, were similarly engaged.

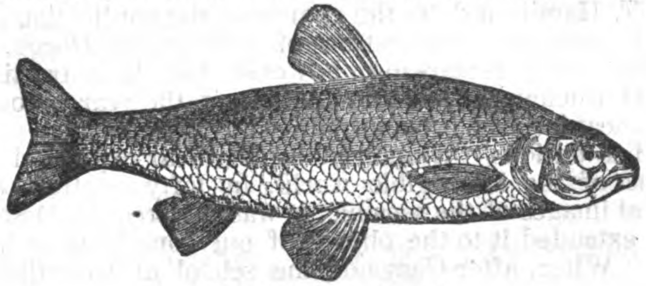
History.—Idaho, an Indian name meaning 'Gem of the Mountains,' was explored by Capts. William Clark and Meriwether Lewis 1805–6, who traversed the two forks of the Columbia river bearing their names. Gold was found in the n. portion 1858, but no permanent settlement was made till 1860. I. formed a portion of Or. Terr. till 1863, and then on its organization as a terr. was given parts of Or., Washington, Utah, and Neb. The next year a part of it was set off to Montana, and the remainder has comprised its limits since. In 1889, Aug.–Sep., a commission appointed by the pres. was in negotiation with the Cœur d'Alene Indians for the sale of the mineral and timber lands and navigable waters on their reservation, that the whole tract might be thrown open to settlement and improvement.

Population.—Gov. Stevenson's annual report 1888 gives the pop. by counties as follows: Ada 11,000; Alturas 16,250; Bear Lake 5,750; Bingham 12,000; Boisé 4,250; Cassia 4,500; Custer 4,000; Idaho 4,000; Kootenai 1,430; Latah 9,630; Lembi 4,600; Nez Percé 5,000; Oneida 6.500; Owyhee 3,350; Shoshone 8,000; Washington 5,000; total 105,260.

IDALIAN, a. *ī-dā'lĭ-an:* of or pertaining to Idalium, town in Cyprus, sacred to Venus, who was thence sometimes called Idalia; pertaining to Venus.

-IDE, suff.: in *chem.*, a termination indicative of combination. It enters into the words oxide, fluoride, chloride, etc.

IDE, *īd* (*Leuciscus Idus*): fish of the family *Cyprinidæ*, of the same genus with the roach, dace, chub, etc. It is a native of the lakes of n. Europe, ascending rivers in April and May to spawn.



Ide (*Leuciscus Idus.*)

IDEA, n. *ī-dē'ă* [L. and Gr. *ĭdĕă* look, appearance, an idea—from Gr. *eido*, I see: F. *idée*]: a notion; that which is seen or conceived by the mind; mental image. IDE'ALESS, a. *-lĕs*, destitute of ideas. IDEAL, a. *ī-dē'ăl* [F. *idéal*—from L. *ĭdĕālĭs*]: existing in idea; mental; unreal IDE'ALLY, ad. *-lĭ*, in idea. I'DEAL'ITY, n. *-ăl'ĭ-tĭ*, in *phren.*, one of the sentiments proper to man; also its organ on the skull; a lively imagination united to a love of the beautiful and perfect. IDEALIZE, v. *ī-dē'ăl-īz*, to form ideas. IDE'ALI'ZING, imp. IDE'ALIZED, pp. *-īzd.* I'DEALIZA'TION, n. *-ăl-ī-zā'shŭn.* IDE'ALISM, n. *-ĭzm*, the doctrine which denies the existence of matter; or according to which the objects of the external world are what they are only through the action of the mind in which they exist as ideas (see below). IDE'ALIST, n. one who holds the doctrine of idealism. THE IDEAL, a type or standard; an imaginary model of perfection; in *painting* and *sculpture*, that which goes beyond nature, yet is modelled upon it. **Beau ideal**, *bō′ ī-dē′ăl* [F. *beau*, beautiful; *idéal*, ideal]: that which unites in one form all the excellences found only in different individual forms.—Syn. of 'idea': notion; perception; conception; belief; doctrine; opinion; — of 'ideal': visionary; fanciful; intellectual; imaginary.

IDE′A: that which is imaged or conceived in the mind. This word has borne very distinct meanings in the history of philosophy. Till the 17th c., it had the signification given to it by Plato, and referred to the Platonic doctrine of eternal forms existing in the Divine mind, according to which forms the world and all sensible things were framed. Plato made a grand distinction between the *intelligible*, or what occupied the intellect, and the *sensible;* the intelligible represented the eternal, the immutable, and the certain; the sensible represented the mutable, and fleeting part of the universe. The forms preceded the matter; the actual circles occurring in nature were produced from a pre-existing ideal circle holding a place in the Divine intelligence; the actual men were generated from an ideal man. The word was used in this sense in literature as well as in philosophy till the 17th c., as in Spenser, Shakespeare, Hooker, and Milton. Thus in *Paradise Lost*—

> 'God saw his works were good,
> Answering his fair *idea*.'

Sir W. Hamilton dates the change in the application of the word from the publication of Descartes's *Discourse on Method* 1637; remarking, however, that in a treatise by David Buchanan, published at Paris the year before, the new meaning had been introduced. 'The fortune of this word is curious. Employed by Plato to express the real forms of the intelligible world, in lofty contrast to the unreal images of the sensible, it was lowered by Descartes, who extended it to the objects of our consciousness in general. When, after Gassendi, the school of Condillac had analyzed our highest faculties into our lowest, the *idea* was still more deeply degraded from its high original. Like a fallen angel, it was relegated from the sphere of Divine intelligence to the atmosphere of human sense; till at last *Ideologie* (more correctly Idealogie), a word which could only *properly* suggest an *a priori* scheme, deducing our knowledge from the intellect, has in France become the name peculiarly distinctive of that philosophy of mind which exclusively derives our knowledge from the senses.'—Hamilton's *Discussions*, p. 70.

In speaking of the mental representation of external things, Descartes, instead of employing the various terms *image, species, phantasm*, etc., which had been the words formerly in use for that particular signification, used the word *idea*. In this he was followed by other philosophers, e.g., Locke, who states that he has adopted the word to stand for 'whatever is the object of the understanding, when a man thinks.' Thus the mental impression that we are supposed to have when thinking of the sun without seeing the actual object, is called our idea of the sun. The idea is thus in contrast with the sensation, or the feeling that we have when the sun is actually seen and our senses are engaged directly or immediately upon the thing itself. The sensation is what constitutes the *thing*, the reality: the impression persisting after the thing has gone, and recoverable by mental causes without the original, is the idea. Although the word in this application may be so guarded as to lead to no bad consequences, Dr. Reid was of opinion that it gave countenance to the setting up of a new and fictitious element in the operations of the mind. This, however, raises the great question of metaphysics—namely, the exact nature of our knowledge of an external world: see PERCEPTION.

It is difficult to avoid the use of the word idea, and yet, owing to the looseness of its application, there is danger of its not conveying a definite signification. We need a general word to express the contrast to sensation, or to actuality; and no better term has yet been found than idea, being what is common to memory and to imagination, and expressing the mind as not under the present impression of real objects, but as by its own tenacity and associating powers, imaging those objects to itself so that to all practical ends they are before its view. Thus, all our sensations, whether of sight, hearing, touch, taste, or smell, and all the feelings that we have in the exercise of our moving energies, become transformed into ideas when, without the real presence of the original agency, we can deal with them in the way of pursuit or avoidance, or can discriminate and compare them, nearly as if in their first condition as sensation. Sir W. Hamilton, in his *Lectures on Logic* (i. 126), has endeavored to avoid employing the word, but other writers on mental philosophy have freely adopted it in the above acceptation. See also BERKELEY, GEORGE: GENERALIZATION: IMAGINATION: IDEAL-REALISM: NOMINALISM: PERCEPTION.

IDEAL-REALISM, n.: in *phil.*, the teaching of an eclectic branch of the Kantian school, which attempted to build up a harmonious system without sacrificing Kant's realistic postulates to his idealistic teachings, or conversely giving up the latter in favor of the former. Schleiermacher, Ulrici, and Trendelenburg, were of this section of Kantists.

IDEAT, n. *ī'dē-at,* or IDEATE, n. *ī'dē-at:* in *phil.*, the correlative or object of an idea; the real or actual existence correlating with an idea.

IDELER, *e'dĕh-lĕr*, CHRISTIAN LUDWIG: 1766, Sep. 21—1846, Aug. 10; b. Gross-Brese near Perleberg in Prussia: astronomer and chronologist. After holding various offices he received a professorship at the Univ. of Berlin 1821. I.'s most important works are, *Historische Untersuchungen über die Astronomischen Beobachtungen der Alten* (Leip. 1806); *Untersuchung über den Ursprung und die Bedeutung der Sternnamen* (Berlin 1809); *Handbuch der Mathematischen und Technischen Chronologie* (2 vols. Berlin 1825–6), the first work that presented a clear view of the reckoning of time among the ancients; and *Die Zeitrechnung der Chinesen* (Berlin 1839).

IDEM, *ī'dĕm* [L.]: the same.

IDEM SONANS, *ī'dĕm sō'nanz:* term sometimes used in law, where a mistake as to a surname is made in a legal document, to denote that the name used by mistake was of a similar sound, in which case the mistake is generally treated as immaterial.

IDENTICAL, a. *ī-dĕn'tĭ-kăl* [F. *identique;* It. *identico*, identical—from mid. L. *identĭcus*—from L. *ĭdĕm*, the same]: the same; the self-same; not different. IDEN'TICALLY, ad. *-lĭ.* IDEN'TIFY, v. *-fī*, to unite or combine in interest, purpose, use, etc.; to become the same; to ascertain or prove to be really the same with something described or asserted. IDEN'TIFYING, imp. IDEN'TIFIED, pp. *-fīd.* IDEN'TIFICA'TION, n. *-fĭ-kā'shŭn*, the act of proving to be the same. IDEN'TITY, n. *-tĭ-tĭ* [F. *identité*—from mid. L. *identĭtātem*]: the state or quality of being the same; sameness, as distinguished from likeness and diversity. In *law*, it must often be proved in legal proceedings, as in proving a marriage, proving a pedigree, proving a thief, etc.: the usual proof is the oath of some one who knew or was cognizant of the facts at both the times referred to. A favorite defense of persons accused of crime is, that it is a case of mistaken identity, in which case the prisoner must generally establish an *alibi*—i.e., that he was in some other place at the time in question. PERSONAL IDENTITY, the sameness of the conscious object, viz., I (the person), throughout all the various states of which it is the subject.

IDEN'TITY, CONTRADIC'TION, AND EXCLU'DED MID'DLE: terms in philosophy, expressive of three principles laid down by the schoolmen as involving the widest generalizations of our necessary beliefs. It has been common to look on some truths as necessary, in opposition to others that, though certain to all intents and purposes, are not necessary, but *contingent*. Thus, it is considered a necessary truth, that two straight lines cannot inclose a space; that the less cannot include the greater; that a man cannot be in two places at the same time. On the other hand, it is not necessary that gold should be yellow, or water transparent: these facts, we conceive, might have been otherwise arranged. There has been much controversy as to this character of necessity that distinguishes some of our beliefs from others: see NECESSITY. The laws of Identity, Contradiction, and Excluded Middle, were anciently laid down as necessities of human thought; but they are scarcely so esteemed in the full sense by modern thinkers.

The law of Identity is expressed thus: 'Whatever is, is;' a proposition justly considered as irresistible. If any objection lies against it, it is, that nothing appears to be got by affirming it. When we say that 'Water freezes at 32°,' there is a piece of new information conveyed; by merely knowing water in its liquid state, we should not know that at 32° it became solid; the affirmation is something real. But when we say that 'Water is water,' there is the form of information, but nothing is conveyed; the proposition belongs to the class termed 'identical.' We merely reaffirm what is already affirmed. The law of identity can only mean that we are to adhere to the meaning of a word as once given; that is to say, we should be consistent in the use of terms. It is a law, not of things, but of the use of words to denote things.

The law of Contradiction is, that 'the same attribute cannot be both affirmed and denied of the same subject;' or that a thing cannot be and not be at the same time. In other words, two affirmations that contradict each other cannot both be true. We cannot say both that the 'Sun has risen,' and the 'Sun has not risen;' 'Gold is heavy,' and 'Gold is not heavy.' Here, also, one might suggest the remark, that the proposition is an identical one; for the use of the word 'not' can only mean that the proposition to which it is coupled cannot be held together with the proposition to which it is not coupled. That if the affirmative be true the negative must be false, and if the negative be true the affirmative must be false, are but the same thing differently expressed. The word 'not' is an abreviation for what would otherwise be a more roundabout expression. Instead of saying: 'I disbelieve, and deny that gold is white,' we say: 'Gold is *not* white.' So far, therefore, the principle of contradiction, like that of identity, is a law not of things, but of the use of language; implying simply, that when we have affirmed a fact in one form of words, we must, in varying our terms, adhere to the same affirmation.

But this remark does not exhaust the scope of the principle. It is evident (see CONDITIONED), that our knowledge can never be confined to one absolute property; in other words, to know a thing, we must know something different from it. We cannot even be conscious of one unvarying impression; animals that live in total darkness are not conscious of the darkness, they would become so only in passing into light. It is true that we are constantly in the habit of mentioning a single property, and leaving out of account the related fact but for which the first would have no existence; we may talk of light without alluding to darkness. But it is not the less certain that the alternative circumstance, for the time suppressed, is a real part of the case; and there are many occasions, when our meaning cannot be fully imparted without actually quoting the alternative; and to be logically or formally complete, we ought at all times to state the two.

There are many qualities the very mention of which brings vividly before the mind an opposed couple: as, up, down; straight, crooked; desire, aversion; etc. But beyond these cases, it is a tenable assertion that every fact or property recognized by the human mind must be recognized with relation to some other fact or property, its contrast or opposite, but for which as an alternative, the mind would not have that opportunity of *transition* essential to consciousness itself. Take *redness*, which does not suggest to the mind an opposite in the same manifest form as in the above instances. If all light were red, there would be no designation of redness; the only terms would be light and dark. But as there are varieties of light, that is, as we experience mental shocks or impressions by transitions occurring under the luminous agency, we are made alive to subordinate differences, which we mark as so many distinct properties. When white and red are presented to the eye in succession, there is imparted a shock of difference, developing an item of knowledge, which, to be fully expressed, would be 'white-red.' White would then mean the opposite of red, and red the opposite of white; to the affirmation, 'Snow is white,' there would correspond as an essential and inseparable part of the same fact, 'Snow is not red.' But as there are a great many transitions of color that make the mind sensible to difference, the mention of one color is attended with, not one simple denial, but many denials. We have red-green, red-yellow, red-blue, etc.; and, moreover, when these couples pass in succession before the view, we are further struck with the fact of *agreement* in the common effect 'redness.' Thus, the fact or property, 'redness,' is the name for the common element in certain couples, which element it affirms, while denying in each case the contrasting element; it is not-white, not-green, not-yellow, not-blue, and not every other color, which placed side by side with it made the mind alive to difference. When, by differences and agreements as now described, a class of colors is constituted, the mention of one is the denial of every other member of the class; and the denial of one is the mention of some other or others, provided we are keeping our attention confined to that class. Prof. De Morgan introduced into logic the phrase 'universe of the proposition,' to intimate the class of objects implied when an affirmation, with its corresponding denial, is given forth. Thus, 'Such a thing is red,' implies as the universe of the proposition the class of colors; 'A rose smells sweet' is in the universe 'odors.'

Many other examples might be quoted in illustration of the general principle; also to show that, in the case of ambiguity or uncertainty in the meaning of a positive term, the proper remedy is to demand an explicit statement of the quality, or qualities, denied. Thus, if a thing is spoken of as 'beautiful,' which contrast is intended? for there are several implied in the name. Is it 'beautiful, not ugly or deformed,' 'not indifferent or insipid,' 'not sublime?' etc. The important function of *defining* terms is thus, in the last resort, to bring into open statement, what is usually left in the form of a tacit understanding, the denial corresponding to each affirmation. See CONDITIONED.

The principle of Excluded Middle is another form of the principle of Contradiction, implying the same general fact, and resting on the same foundation. It is, that of two contradictories, both cannot be false, or one must be true. Any given assertion must be *either* true or false; either the affirmative is true, or otherwise the negative is true, which means that the affirmative is false. 'This house is either mine or not mine;' 'Gold is yellow, gold is not yellow,' cannot be both false, one must be true. There is no *middle course* in such an alternative. But onexamination, it will appear that this principle does not hold in the same unqualified sense as the principle of contradiction; for the attribute affirmed or denied must be something intelligible and definite, as well as relevant to the subject in hand. We often say such a thing is neither big nor little, implying that there is a certain mean point that excludes the extremes, and yet those two terms are the negative of each other. In a word, it is an essential condition of the principle that the universe of the proposition should be distinctly understood and kept in view. If we say, 'this is either red or not red,' the alternative is indisputable within the universe 'color,' but not otherwise; the taste of an orange is neither red nor not red: if we pass beyond the boundaries of the class, the principle no longer holds good.

Thus these three principles are not absolutely imperative as laws of thought. We have seen that in the case of the Excluded Middle, there are possible evasions; and even the principle of Contradiction itself is flatly met by Hegel, who lays it down as a maxim of his philosophy that 'being' and 'not being' are the same, and deduces important inferences therefrom.

IDEOGRAPHIC, a. *ĭd'ĕ-ō-grăf'ĭk*, or ID'EOGRAPH'ICAL, a. *-ĭ-kăl* [Gr. *īdĕă*, an image or idea; *graphō*, I write]. denoting that way of writing which expresses the notion or idea and not the sound, as in figures, symbols, or hieroglyphics; expressing or representing ideas. ID'EOG'-

RAPHY, n. *-ŏg'ră-f ĭ,* the expression or representation of ideas, as in shorthand-writing, symbols, etc. IDEOGRAMS, n. plu. *ĭd'ĕ-ō-grămz* [Gr. *gramma,* a letter]: also ID'EOGRAPHS, n. plu. *-grăfs,* notions or ideas expressed in symbols or hieroglyphs; hieroglyphs.

IDEOLOGY, n. *ĭd'ĕ-ŏl'ŏ-jĭ* [Gr. *īdĕă,* an idea; *logos,* speech, discourse]: the science of ideas or of mind; mental philosophy. ID'EOLOG'ICAL, a. *-lŏj'ĭ-kăl,* connected with or relating to the doctrine of ideas. ID'EOL'OGIST, n. *-jĭst,* one who treats of ideas.

IDES, n. plu. *īdz* [L. *īdūs,* the Ides—from the Etruscan *ĭdŭō,* I divide: It. *idi:* F. *ides*]: in the *anc. Rom. calendar,* the 15th day of the months March, May, July, and October, and the 13th day of the other months: see CALENDS. *Note.*—Skeat says IDES is probably connected with Skr. *Indu,* the moon.

ID EST, phrase, *ĭd ĕst* [L.]: that is; frequently shortened into i.e.

IDIOCRASY, n. *ĭd'ĭ-ŏk'ră-sĭ* [Gr. *ĭdĭŏs,* peculiar to one's self; *krāsĭs,* mixture]: peculiarity of constitution—same as *idiosyncrasy.* ID'IOCRAT'IC, a. *-krăt'ĭk,* or ID'IOCRAT'ICAL, n. *-ĭ-kăl,* peculiar in constitution or temperament.

IDIOCY, n. *ĭd'ĭ-ŏ-sĭ:* see under IDIOT.

ID'IOCY: non-development of the mental faculties; distinguished from the form of insanity called dementia which consists in the loss of mental powers formerly possessed. The idiot has never become possessed of his mental faculties; his mind is a blank, or largely so: the demented person has lost a part—it may be almost all—of his mind; still he has vestiges of previously formed ideas. See INSANITY: also CRETINISM: IMBECILITY. In certain cases of idiocy, the human form appears scarcely animated by intelligence at all; it is a senseless, motionless mass, to which the special senses impart no intimation of an external world, and from which there emanate no manifestations of human love or passion, or perception. The degrees of lack are, however, very numerous and sharply defined, so as to suggest different modes of management and training and different degrees of moral responsibility in the individuals. The general characteristics of the vast majority of idiots may be held to be diminutive stature, grotesque appearance, inactivity, uncleanly habits, gluttony, obtuse or acute sensibility, inability to regulate movements, to articulate, to count, degradation of propensities, and helplessness. The various degrees of their dependence upon others has been estimated thus: of 574—53 were as helpless as infants; 74 as children of two years old; 94 as children of seven years old; 138 could engage in simple work with some small profit, if carefully watched and directed; 179 could nearly earn their bread; and 36 could, under due discipline, maintain themselves. In this calculation, imbeciles are included. The arrest of the evolution of intelligence, in whole or in part, may commence and be consummated previous to birth, in consequence of moral impressions or accidents or diseases on the part of the mother; during infancy, from defective nutrition or injudicious management; and during childhood up to puberty, from scrofula, rickets, hydrocephalus, and from unwise interference with the faculties in process of growth. A large number of idiots are microcephalous, or have heads of very small dimensions; and though they decay and die at an early age, they are apparently healthy. But a much larger number are not merely examples of imperfect growth; they labor under positive disease and degeneration, with symptoms either of constitutional taint, or of those specific affections, such as convulsions and paralysis, as are referred to the nervous structure.

The ameliorations which occasionally take place under judicious treatment, and the educability of a few individuals within a certain range, have suggested to physicians and philanthropists the propriety of attempting to rouse, direct, and apply such powers as may exist. The first attempt to give regular instruction to idiots was made in the Bicêtre at Paris many years ago. A magnificent training-school, now numbering about 600 inmates, has been some time in operation at Earlswood, Reigate, England; and there is a similar institution in Scotland. At the Bicêtre, near Paris, Dr. Edouard Seguin, at the suggestion of Itard, opened a school for idiots 1838. His system was based on the theory that idiocy was prolonged infancy. Shortly after 1848 he visited the United States; and later he settled in this country, and taught in various idiot institutions (see SEGUIN, EDOUARD). Dr. Hervey B. Wilbur at Barre, Mass., later at Albany and Syracuse, N. Y., also labored devotedly in this cause. The success of idiot instruction is very variable in different classes of cases; but is on the whole much beyond what was deemed possible a half-century ago. Seguin, *Traitement Moral, etc., des Idiots* (the standard work on education of idiots); Art 'Idiotisme,' *Dict. de Médecine;* Abbots, *Handbook of Idiocy;* Buckminster Brown, *Treatment and Cure of Cretins and Idiots;* Howe *on the Causes of Idiocy;* Reports, Idiot School, Earlswood; *De l'Idiotie chez les Enfans*, par Felix Voisin. The increase in idiocy in the United States as far as cases have come under official notice has been (1850) 15,787; (1860) 18,930; (1870) 24,527; (1880) 76,895. The last reported distribution was:

Ala.	2,223	**Ind.**	4,725	**Neb.**	356	**Tex.**	2,276
Ariz.	11	**Io.**	2,314	**Nev.**	18	**Utah.**	148
Ark.	1,374	**Kan.**	1,083	**N. H.**	703	**Vt.**	803
Cal.	507	**Ky.**	3,513	**N. J.**	1,056	**Va.**	2,794
Colo.	77	**La.**	1,053	**N. M.**	122	**Wash. Ter.**	47
Conn.	817	**Me.**	1,325	**N. Y.**	6,084	**W. Va.**	1,367
Dak.	80	**Md.**	1,319	**N. C.**	3,142	**Wis.**	1,785
Del.	269	**Mass.**	2,031	**O.**	6,460	**Wyo.**	2
D. C.	107	**Mich.**	2,181	**Or.**	181		
Fla.	369	**Minn.**	729	**Penn.**	6,497		
Ga.	2,433	**Miss.**	1,579	**R. I.**	234		
Ida.	23	**Mo.**	3,372	**S. C.**	1,588		
Ill.	4,170	**Mont.**	15	**Tenn.**	3,533	**Total,**	76,895

Of this total 2,429 were in institutions for idiots, 1,382 in other institutions, 5,837 in almshouses, 47 in jails, and

67,200 at home; 45,309 were males, 31,586 females, 72,888 natives, 4,007 foreign, 67,316 white, and 9,579—including 5 Chinese and 84 Indians—colored.

IDIOM, n. *ĭd'ĭ-ŭm* [F. *idiome*, idiom, language—from Gr. *ĭdĭōmă*, peculiar phraseology—from *ĭdĭŏs*, peculiar to one's self: It. *idioma*, mode of speech]: a mode of expression or form of speech peculiar to a language or a dialect; phraseology. IDIOMATIC, a. *ĭd'ĭ-ō-măt'ĭk*, peculiar to a language; phraseological; also ID'IOMAT'ICAL, a. *-ĭ-kăl*. ID'IOMAT'ICALLY, ad. *-lĭ*.

IDIOPATHIC, a. *ĭd'ĭ-ō-păth'ĭk* [Gr. *ĭdĭŏs*, peculiar; *pathos*, suffering]: not depending on any other disease; arising without any apparent exciting cause; opposite of *sympathetic*. ID'IOPATH'ICALLY, ad. *-ĭ-kăl-lĭ*. ID'IOP'ATHY, n. *-ŏp'ă-thĭ*, disease not dependent on any other disease.

IDIOREPULSIVE, a. *ĭd-ĭ-o-rē-pŭl'sĭv* [Gr. *idios*, peculiar to one's self; Eng. *repulsive*]: in *physics*, producing repulsion by its unaided action, as, the *idiorepulsive* action of heat.

IDIOSYNCRASY, n. *ĭd'ĭ-ō-sĭng'kră-sĭ* [Gr. *ĭdĭos*, peculiar to one's self; *sŭngkrăsis*, a mixing together]: a peculiarity of constitution or temperament of body in which certain articles of food or medicine generally produce effects different from those which usually occur: also the temperament of mind peculiar to an individual which affects his character and actions; constitutional antipathy. Thus, there are persons who have great dislike to particular food, smells, sounds, etc., which to most persons are agreeable; and, on the other hand, a desire is sometimes manifested for things generally disliked. In particular individuals, an eruption of the skin is caused by eating strawberries, or swooning by the smell of a rose, and that quite unconnected with any liking or disliking, or even with any knowledge of the cause. Idiosyncrasies also occur, in consequence of which certain medicines become inoperative, or certain poisons harmless. Idiosyncrasies are either permanent or temporary, sometimes arising from mere morbid conditions, and disappearing with them. The term is applied to *mental* as well as *physical* peculiarities. ID'IOSYNCRAT'IC, a. *-krăt'ĭk*, or ID'IOSYNCRAT'ICAL, a. *-ĭ-kăl*, of peculiar temperament of body or mind.

IDIOT, n. *ĭd'ĭ-ŏt* [F. *idiot*—from L. *ĭdĭōtă*, an uneducated ignorant person—from Gr. *ĭdĭōtēs*, a private individual—from *ĭdĭŏs*, proper, peculiar to one's self: It. *idiota*, an ignorant common person—*lit.*, a private person]: a human being more or less defective in his mental and moral powers; a natural fool; a very foolish person. ID'IOCY, n. *-ŏ-sĭ*, state of being an idiot; extreme imbecility, in which reason has been wholly undeveloped, or but partially developed; also ID'IOTCY, n. *-ŏt-sĭ*. ID'IOT'IC, a. *-ĭk*, like an idiot; also ID'IOT'ICAL, a. *-ĭ-kăl*. ID'IOT'ICALLY, ad. *-lĭ*. ID'IOTISM, n. *-ĭzm*, natural imbecility of mind.

IDIOTHALAMEÆ, n. *ĭd-ĭ-o-tha-lăm'ē-ē* [Gr. *idios*, one's own; *thalamos*, an inner room]: tribe of lichens, having shields first close, and then open, and the nucleus gelatinous, made up of naked spores.

IDIOTYPE, n. *ĭd'ĭ-o-tīp* [Gr. *idios*, peculiar; Eng. *type*]: in *chem.*, term applied to bodies derived by replacement from the same substance, including the typical substance itself. Ammonia is idiotypic with ethylamine and all other organic bases derived from it by substitution.

IDLE, a. *ī'dl* [Ger. *eitel;* Dut. *ijdel*, vain, trifling: Sw. *idel*, mere, downright]: vain; unimportant; not employed; averse to labor; useless; frivolous; unprofitable: V. to lose or spend time; in *OE.*, to play lightly. I'DLING, imp. IDLED, pp. *ī'dld.* IDLER, n. *ī'dlėr*, one who; in *mach.*, a cog-wheel placed between two others to communicate the motion of one to the other; in *naut.*, a person on board ship who, being liable to constant day-duty, is not required to keep night watch. IDLY, ad. *ī'dlĭ*, in an idle manner; vainly. I'DLENESS, n. *-dl-nĕs*, the state of being unemployed; sloth; omission of business; the state of lying useless or unemployed. TO IDLE AWAY, to spend or waste in idleness. IDLE-HEAD'ED, or -PA'TED, exceedingly stupid. IDLESS, or IDLESSE, n. *-ī'dl-ĕs*, poetical for *idleness.*—SYN. of 'idle, a.': lazy; indolent; unoccupied; unemployed; inactive; vacant; sluggish; slothful; futile; useless; trifling; vain; unimportant; ineffectual; barren;—of 'idleness': indolence; sluggishness; inaction; laziness.

IDLE, *ī'dl:* town in the W. Riding of Yorkshire, England; near the river Aire, 9 m. n.w. of Leeds. Woolen cloth is the staple manufacture. Pop. (including Windhill) (1861) 9,155; (1871) 12,036.

IDOCRASE, n. *ĭd'ō-krās* [Gr. *eidos*, form; *krasis*, a mixture]: a mineral, a variety of garnet, so termed from its crystalline forms being mixed figures; vesuvianite: see VESUVIAN.

IDOL, n. *ī'dŏl* [F. *idole*, an idol—from L. *īdōlŏn;* Gr. *eidōlŏn*, an image, a form: It. *idolo*]: an image employed as an object of worship; any person or thing loved beyond measure: a term used by Bacon to denote a fallacy of the mind. IDOL'ATER, n. *-dŏl'ă-tėr*, one who worships idols or images. IDOL'ATRESS, n. *-trĕs*, a woman who worships images. IDOL'ATROUS, a. *-trŭs*, tending to or comprising idolatry. IDOL'ATROUSLY, ad. *-lĭ.* IDOL'ATRY, n. *-ă-trĭ* [F. *idolâtrie*—from mid. L. *idōlātrĭă*—from Gr. *eidōlŏn*, an image; *latreia*, service]: the worship of images; love bordering on adoration. IDOLIZE, v. *ī'dŏl-īz*, to love to excess. I'DOLI'ZING, imp. I'DOLIZED, pp. *-īzd.* I'DOLI'ZER, n. *-zėr*, one who idolizes or loves to excess. IDOLISM, n. *ī'dŏl-ĭzm*, idolatrous worship. I'DOLIST, n. *-ĭst*, a worshipper of images.

IDOL'ATRY: act of worshipping an image supposed to be, or intended to represent, a divinity. Although the first principles of reason suggest to man's mind the idea of one Supreme Being, the source of all existing things, and the origin of all good (see GOD), yet the very earliest historical records, sacred and profane, teem with evidences of the errors into which men quickly fell through ignorance and passion, changing 'the glory of the uncorruptible God into an image made like to corruptible man, and to birds, and four-footed beasts, and creeping things' (Rom. i. 23). To these images, as well as to the images of inanimate objects, or of the ideal powers or forces supposed to be embodied in such objects—as the sun, the moon, the stars, air, water, fire, and other natural elements—divine honors were paid by most of the ancient nations; to which honors the name idolatry has been given. Hence, as each of these corrupt worships had its own peculiar symbols, the idolatry of the ancient Gentile religions may be reduced to four classes: 1. The I. of nature-worship, which was of two kinds—the first of inorganic nature, which consisted chiefly in *Litholatry*, or the worship of stones or pillars, mentioned Lev. xxvi., and Num. xxxiii. 52, the second of organic nature, or of the powers of nature, as *Dendrolatry*, or the worship of trees—under which form were symbolized the productive or generative powers of nature, and to which the most modern investigators of Phœnician antiquities trace the origin, as well of the grossly immoral worship of the *Ashtaroth* of the Phœnicians, as of the phallic worship, which found its way, under various forms, through all the kindred races, both in the West and in the East. 2. The I. of animal-worship, which we find as well in the (perhaps originally symbolical) worship of the sacred oxen, the crocodiles, and serpents among the Egyptians, as in that of the still more degrading forms of animal life which constituted the object of adoration with other nations. 3. A higher form of I. which prevailed among the races of Chaldean origin, *Astrolatry*, or star-worship, often designated by the name *Sabæism*. There was one form of Sabæism which cannot strictly be called I. as it did not involve the use of idols, but addressed itself directly either to the heavenly bodies themselves, or to the element of fire, with which they were associated. But the same object of religious worship, coupled with the use of idolatrous representations, is found in the worship of Baal, of Moloch, and of Tammuz, the Phœnician Adonis (Ezek. viii. 14). 4. The form of I. which prevailed in the later period of the ancient Gentile religions, *Anthropolatry*, or the worship of representations of the human form. It is familiar to us chiefly through the mythology of Greece and Rome, but it found place also in most of the other religious systems, in some of which the representations of the human form were variously modified to symbolize those special attributes which formed the peculiar objects of the worshippers' adoration. Of this there are many examples in the mythological representations of the Egyptians and of the Indians. In the Egyptian religion, indeed, and in the later Grecian, many of the idols were representations of pure abstractions, as of certain faculties or affections of the mind, of virtuous desires, or of evil passions. Nor can it be doubted, that among the more cultivated classes, there were individuals by whom these abstractions were understood, and by whom the crude I. of the multitude was regarded solely as a device adapted to their more gross and material conceptions.—See IMAGE-WORSHIP.

The Jews, notwithstanding the many safeguards by which the belief of the one Living God, Jehovah, was protected in their religious system, were frequently seduced into the idolatrous worship of the Gentile nations among which they were thrown. It is one of the most remarkable among the anomalies of the history of this singular people, that the great and radical purification of their faith in the unity of God dates from their protracted Babylonian captivity; from which time the worship of the One God, Jehovah, was maintained, notwithstanding the effort of Antiochus Epiphanes to introduce the Greek idolatry (I Macch. i.), until the coming of the Lord Jesus. The I. into which the Jews fell at different periods was chiefly of the first and the third forms described above.

The I. of the savage tribes of the African and Oceanican races, is mostly of the class known as FETICHISM: see FETICH.

IDOTHEA, n. *ī-do-thē'a:* in *zool.*, typical genus of the *Idotheidæ*, a family of cursorial isopoda.

IDRIA, *ĭd'rĭ-a* or *ē'drē-â:* small but important town of Austria, in the crownland of Carniola, celebrated for its quicksilver mines (discovered 1497). It is in a deep, caldron-shaped valley, on the river I., 22 m. w.s.w. of Laibach. The descent to the mines is by 787 steps, hewn in the rock, and is easy, and free from danger. The mines are said to be the richest in Europe. More than 330 tons of quicksilver are produced here annually, and about 60 tons of cinnabar (red sulphuret of mercury). Beside mining, the manufacture of linen and silk fabrics and bone-lace, and distilling spirits, gives employment to the people. Pop. (1880) 4,174.

IDRIALINE, n. *ĭd'rĭ-ă-lĭn:* one of the mineral resins, so named from its being found at *Idria*, in Carniola.

IDRI'SI, or ADRI'SI: see EDRISI.

IDUME'A: see EDOM.

IDUN, *ē-dôn'* or IDUNA, *ē-dô'nâ:* goddess of the northern mythology; daughter of the dwarf Svald; but being received among the Æsir, she became the wife of Bragi. I. possessed a precious apple, by the use of which the gods preserved their perpetual youth. She was carried off by the giant Thiassi, with the assistance of Loki; but the gods sent Loki after her, to bring her back, which he did, after changing himself into a falcon, and I. into a nut.

IDYL, or IDYLL, n. *ī'dĭl* or *ĭd'ĭl* [L. *idyllĭŭm*—from Gr. *eidŭl'lĭŏn*, a pastoral poem—from *eidŏmai*, I appear, I seem]: short descriptive poem, generally pastoral; a poem of romance and fancy. Though the I. usually represents the simple scenes of pastoral life, it is not exclusively pastoral. in the usage of either the ancients or the moderns. Of the 30 *Eidyllia* of Theocritus, not more than one-half are pastoral. After the use made of the word by Tennyson, in his *Idylls of the King*, which are epic in their style and treatment, and romantic and tragic in their incidents, it becomes difficult to say what poem is not an idyll. IDYL'LIC, a. *-lĭk*, of or pertaining to idyls.

IE'SI: see JESI.

IF, conj. *ĭf* [AS. *gif;* Dut. *of*, if, but: Icel. *ef*, if; *efa*, or *ifa*, to doubt]: a word which introduces a conditional clause; supposing; provided; whether or not.

IFURIN: in the *Celtic mythology*, the infernal region; terrible with dragons, serpents, and an atmosphere of poison; the abode of the vile, in the belief of the ancient Gauls.

IG, *ĭg:* another form of the prefix IN, signifying *not:* see IN.

IGASURIC ACID, *ĭg'ă-sŭ'rĭk ăs-ĭd* [Mal. *igăsūră*, a vomiting nut]: an acid found in nux vomica and Ignatius' bean. IGASURINE, very poisonous alkaloid, found 1853 in the mother-liquors from which strychnine and brucine had been precipitated by lime.

IGLAU, *ē'glow* or *ĭg'low*, or JIHLAVA: very old walled town of Austria, province of Moravia, on the river Iglawa, close to the Bohemian boundary, 49 m. w.n.w. of Brünn. It consists of the town proper and of three suburbs. In the midst of the spacious and beautiful town square, stands the guard-house. I. carries on spinning, dyeing, and brewing, and has extensive manufactures of woolen goods and of machinery. Its trade, especially with Poland, is important. Several very productive silver-works are in operation here. Pop. (1880) 22,378.

IGLESIAS, *ē-glā'sē-âs :* walled city of Sardinia, province of Cagliari; 32 m. w.n.w. of Cagliari city. It is in a very fertile region, and its vicinity abounds in rich silver and lead mines. Because of its mines, large number of churches, and beautiful suburban gardens, it is variously known among Sardinians as the 'city of the mines,' 'city of the churches,' and 'flower of the world.' Its chief industries are the manufacture of woolen and linen fabrics by women. Pop. 12,094.

IGLESIAS, JOSÉ MARIA: statesman: b. Mexico City, 1823, Jan. 5. He was educated in the Univ. of Mexico, admitted to the bar 1844, appointed prof. of jurisprudence 1845, entered political life 1846, was an official of the supreme tribunal of war and milit. judge for the army of the East during the Mexican war, elected member of congress 1852, appointed chief of the bureau of public credit 1855, minister of justice 1857, supported the govt. during the French occupation, minister of the treas., justice, and the interior, under Pres. Juarez; elected chief-justice of the supreme court 1873, declared the re-election of Pres. Lerdo illegal, and by virtue of his office claimed the provisional presidency, installed his govt. at Guadalajara 1877, Jan. 2; was defeated by Gen. Diaz, removed to the United States 1877, Jan. 17, returned to Mexico 1878, and has since applied himself to editorial and literary work.

IGLOO, n. *ĭg'lô* [Esquimaux]: a hut, usually circular, made of snow; an excavation made by a seal in the snow over its breathing-hole, for the protection of its young.

IGLOOLIK, *ĭg-lô'lĭk:* island of some historical interest, near the e. end of the Strait of the Fury and Hecla, lat. 69° 21′ n., and long. 81° 53′ w. It was named after an intelligent Esquimaux woman, Parry's guide and pilot on his second voyage; and here that navigator passed the winter of 1822–3, from Oct. 30 to Aug. 12. During this time, the temperature ranged between −45° and 59° F., a mean of 7° above zero.

IGNATIA AMARA, *ĭg-nā'shĭ-ă ăm-ā'ră* [St. *Ignatius; amārus*, bitter]: St. Ignatius' bean: called also Strychnos Ignatia: see Ignatius' (St.), Bean.

IGNATIEFF, *ĭg-nâ'tē-ĕf*, Nicolas Paulovitch: soldier and statesman: b. St. Petersburg, 1832, Jan. 29. He was educated in the Imperial Corps des Pages, entered the Imperial Guard 1849, served through the Crimean war, and the Poland insurrection, was milit. sec. to the Russian embassy at London, won imperial favor by a detailed report on the position of Great Britain in India, was sent on a diplomatic mission to Khiva and Bokhara, appointed ambassador to Pekin 1860 and Constantinople 1864, was minister of the interior 1878–82, re-appointed 1889, May. He opposed the policy of the late Prince Gortschakoff. He married the wealthy Princess Galitzin.

IGNATIUS, *ĭg-nā'shĭ-ŭs*, Saint: Bishop of Antioch, at a date uncertain, but after A.D. 69; d. 107 (or 116): said to have been a disciple of the apostle John, and reckoned one of the apostolical Fathers. The chronology of the bishopric of Antioch is not known: some make I. the second, others the third bishop. Equally uncertain is the date of the writings ascribed to him. He bore the surname *Theophoros*—i.e., one who carries God [or as I. explained it, 'Christ'] in his heart; or, again, as some (Jerome among them) wrongly supposed, 'one who was carried by God'—i.e., by Christ, referring to the legend, utterly worthless, that he was the little child referred to, Mk. ix. 36. Ignatius was a true shepherd of his people, one of those meek, earnest, loving spirits to whose unobtrusive piety Christianity owed its first and best triumphs. Domitian's persecution of the church of Antioch proved his courage, and in the second and fiercer persecution of Trajan, I. was sacrificed for his flock. A story of his interview with Trajan has come down to us. That strong ruler, full of worldly sagacity, just after his pagan fashion, could not understand a man so utterly unworldly as Ignatius. He contemptuously called him a *kakodaimon* (one having an evil genius or demon), and in the end condemned him 'to be led as a prisoner to Rome, there to be made the food of wild beasts for the amusement [*ad delectationem*] of the people.' In the Church of Rome, his martyrdom is commemorated Feb. 1; in the Greek Church, Dec. 20.

The genuineness of the writings (a Liturgy, and a little work entitled *Didaché*, quoted by Chrysostom) of the epistles ascribed to him—of which 15 (12 in Greek and 3 in Latin) are extant—some of which are quoted in the 2d, 3d, and 4th c., and were widely read in the ancient church—has been much disputed since the 16th c. The common opinion of scholars (until perhaps the last 30 years) was in favor of the genuineness of seven of the Greek epistles, which are extant in two redactions of different length, and in two corresponding ancient Latin translations—those to the Ephesians, Magnesians, Philadelphians, Trallians, Smyrnæans, Romans, and to Polycarp, his contemporary; but even these were regarded as spurious by Daillé, Semler, Hermann, Ernesti, and others, with whom in the main Neander concurs. The controversy received a new impetus by the publication of Bunsen's *Ignatius und seine Zeit* (Hamb. 1847), in which that writer endeavored to establish the genuineness of three of the seven epistles, and the spuriousness of the others; his conclusions were, however, assailed by the great leader of the Tübingen school, F. C. Baur, in his *Die Ignatianischen Briefe und ihr neuester Kritiker* (Tüb. 1848). The most probable view of the seven epistles is that which conceives them to have a basis of genuineness, but to have suffered extensive interpolation. The reason why these epistles have excited so keen an interest among ecclesiastics, is, that the question of church government is dealt with in them; they are, in fact, a battle-ground between advocates of prelatical (Rom. Cath. and Episc.) and non-prelatical (Congl. and Presb.) views; and as they seem to favor the heirarchical system of the former, prelatists have, as a rule, been strenuous in defense of their Ignatian origin, while non prelatists have as warmly attacked it. The discovery, in an Egyptian convent, of a Syriac version (S) of three of the epistles—those to the Romans, the Ephesians, and to Polycarp (pub. by the Rev. W. Cureton, formerly of the British Museum, under the title, *The Ancient Syriac Version of the Epistles of St. Ignatius*, etc., Lond. 1845; and, still better, *Corpus Ignatianum*, Berlin 1849), on account of what were considered the higher claims of the Syriac to be considered genuine than any Greek MSS., led to the opinion that the common Greek text has been very seriously tampered with—the interpolations consisting often of passages enforcing episcopal authority, and asserting the deity of Jesus Christ. This opinion that the Greek text has been changed, may be true; but the latest judgment of scholars is that the Syriac (S) is nothing more than an extract from G^1 (the short Greek version). It is still a question whether the epistles extant under the name of Ignatius are genuine or spurious. It is pointed out, however, that though the epistles extol the bishop, and draw sharp distinction between the episcopal and the presbyterial office in the church, they give no hint of an establishment of the episcopate by the apostles; they do not connect with it those ideas of a priesthood which abound in later writers; and they treat it as an office in the congregation or local church rather than in the church general.

The text of the writings ascribed to I. is in the various editions of the Apostolic Fathers, from that of Cotelerius (2d. ed. 1724) to the recent and admirable one edited by Gebhardt, Harnack, and Zahn (1876). There are English translations by Archbishop Wake and in the *Ante-Nicene Library* (Clark, Edin.). See Zahn, *I. von Antiochien* (1873).

IGNA'TIUS' (St.), BEAN: seed of the *Ignatia amara*, formerly *Strychnos Ignatii*, tree of nat. ord. *Loganiaceæ*, nearly allied to that which produces *Nux vomica* (q.v.); native of Cochin-China and of the Philippine Islands. The fruit is of the size of a large pear, and contains about 20 brownish seeds, about the size of olives, rounded on one side, somewhat angular on the other. These seeds were brought into the Dutch shops under their present name about the end of the 17th c., but there is some reason to think that they are the *nux vomica* of earlier writers. They contain *strychnia*, and their medicinal uses are similar to those of *nux vomica*.

IGNA'TIUS DE LOYO'LA, Saint: see Loyola.

IGNEOUS, a. *ĭg'nĭ-ŭs* [L. *ignĕŭs*, burning—from *ignis*, fire: It. *igneo;* F. *igné*, igneous]: containing fire; consisting of fire; produced by fire; resulting from the action of fire, as igneous rocks.

IGNEOUS ROCKS: those which have been produced from materials fused by heat. They differ from the sedimentary rocks in origin, structure, and position. They invariably come from below upward, breaking through the older rocks. The materials of sedimentary strata are fragments of pre-existing rocks, worn, by the action of water, either into a fine mud or into rounded particles, of greater or less size; whereas I. R. exhibit either a vitreous structure, as when they have been quickly cooled; or a granular structure, composed of more or less minute crystals, according to the rate of cooling; or a vesicular structure, when they have been expanded by the contained gases, or by being brought into contact with water. Some rocks are erroneously called igneous, whose materials, though originally obtained from volcanoes or other subterranean source, have yet been ultimately arranged by water, like the materials of Grahame's Island (q.v.). When this fact receives due consideration, many I. R. whose position is now a puzzle, will be better understood. Some of the rocks composing Arthur's Seat, near Edinburgh, are undoubtedly of this character, and before a right theory of the hill can be constructed, these must be separated from the truly igneous rocks. In position, also, the igneous may be distinguished from the sedimentary rocks, for they seldom occur regularly stratified, with a parallel upper and under surface, but are generally local, thinning into wedge-shaped beds, or having that irregular stratification seen in modern lava. They occur also as upright walls or dikes, filling up cracks in the sedimentary strata.

The most satisfactory classification of the I. R. is based on their age. The three divisions thus established are characterized each by peculiar mineral and structural differences. The oldest or Granitic series (see Granite) are generally associated with the Paleozoic strata, but are sparingly found in the Secondary, and even in the Tertiary formations. The special peculiarity of the granitic rocks is the great abundance of silica in them; it forms not only a considerable amount of the constituents of the hornblende and felspar, but crystallizes free in the rock-mass as rock crystal. The Trappean Rocks (q.v.) are associated with the Paleozoic and Secondary strata, and are composed of crystals of felspar and hornblende, varying in character according to the predominance of the one or other of these ingredients. The Volcanic (q.v.) are the newest I. R.; they belong to the present period, or the Tertiary strata. The chemical ingredients are the same as those that constitute the Trappean rocks; but they are somewhat differently built up, augite being the peculiar form which the silicate of magnesia and lime assumes in the newer rocks, while it appears as hornblende in the older or Trappean series.

IGNESCENT, a. *ĭg-nĕs'sĕnt* [L. *ignescens* and *ignescen'tem*, becoming fire—from *ignis*, fire]: emitting sparks of fire when struck with steel.

IGNIGENOUS, a. *ĭg-nĭj'ĕ-nŭs* [L. *ignis*, fire; Gr. *gennăō*, I produce]: produced by fire; fire-formed—referring to the result rather than to the operation or agency.

IGNIPOTENT, a. *ĭg-nĭp'ŏ-tĕnt* [L. *ignis*, fire; *potens*, powerful]: presiding over fire, as Vulcan.

IGNIS-FATUUS, n. *ĭg-nĭs-făt'ū-ŭs* [L. *ignis*, fire; *fatŭŭs* foolish]: luminous meteor sometimes seen flitting about in the air a little above the surface of the earth, chiefly in marshy places or near stagnant waters—familiarly called *Jack-with-a-lantern*, and *Will-with-a-wisp*, or *Will-o'-the-wisp;* thence something fanciful, unreal, or unattainable; a utopian scheme. The I. F. has puzzled philosophers from the time of Aristotle. It generally appears a little after sunset, as a pale bluish-colored flame, varying in size and shape; sometimes it shines steadily till morning, at other times disappears, and reappears within about half-hourly intervals. It floats in air about two ft. from the ground, is sometimes fixed, and sometimes moves with great rapidity. In general, it recedes on being approached, and *vice versâ*, though several successful attempts have been made to light a piece of paper by it. Many efforts have been made to discover its cause; but so varied are its appearances, and so void of any common principle, that these attempts have failed. Of the various theories advanced only two need be mentioned. The first is, that the I. F. is due to *phosphuretted hydrogen gas* (PH_3), in which is generally present some portion of the phosphorous compound which possesses the power of spontaneous ignition on coming in contact with dry atmospheric air; the gas would be generated by the decomposition of animal matter present in a marshy soil. The motion of the I. F. is accounted for by the flame being communicated along the line of a stream of the gas. The second is, that it is due to the combustion of *light carburetted hydrogen gas, methane* or *marsh gas* (CH_4), arising from the decomposition of vegetable matter; but though this supposition satisfactorily accounts for many appearances connected with the I. F., the gas itself is not spontaneously combustible, and an additional supposition requires to be made to account for its ignition. The probable conclusion is, that a number of phenomena similar to the eye, but arising from different causes, are aggregated under the term I. F. *The I. F., however, has never been produced artificially.* Electricity and phosphorescence can produce the luminous appearance, but as far as our present knowledge enables us to judge, they are unable further to imitate it.

It is not a common phenomenon, many distinguished naturalists never having seen it; but it is frequently seen in n. Germany, in the swampy and moorland districts in s. and n.w. England, and in the Lowlands of Scotland. It is seen in the above places from the middle of autumn till the beginning of November. In former times, the I. F. under the names of *Will-o'-the-wisp, Jack-a-lantern, Spunkie,* etc., was an object of superstition among the uneducated, and was believed due to the agency of evil spirits attempting to lure the traveller to his destruction; and indeed there have been instances of travellers mistaking it for a lamp or lantern and being thus decoyed into marshy places, where they perished.

IGNITE, v. *ĭg nīt'* [L. *ignītŭs,* fiery, glowing—from *ignis;* Skr. *agni,* fire: It. *ignito,* ignited]: to kindle; to render red or luminous by heat; to take fire. Igni'ting, imp. Igni'ted, pp. Igni'tible, a. *-tĭ-bl,* capable of taking fire. Ignition, n. *ĭg-nĭsh'ŭn* [F.—L.]: the act of setting on fire; the state of being kindled; differing from *combustion,* which is a consequence of ignition.

IGNIVOMOUS, a. *ĭg-nĭv'ō-mŭs* [L. *ignis,* fire; *vomo,* I vomit]: vomiting fire.

IGNOBLE, a. *ĭg-nō'bl* [F. *ignoble*—from L. *ignōbĭlĭs,* unknown—from *in,* not; *nōbĭlĭs,* well-known, noble: It. *ignobile*]: *literally,* of low birth or family; worthless; base; low, mean, or base, as in thoughts, words, or actions. Igno'bly, ad. *-blĭ.* Igno'bleness, n. *-bl-nĕs,* meanness; want of dignity.—Syn. of 'ignoble': dishonorable; scandalous; infamous; degenerate; degraded; disgraceful; reproachful; shameful.

IGNOMINIOUS, a. *ĭg'nō-mĭn'ĭ-ŭs* [L. *ignōmĭn'ĭă,* discredit, reproach—from *in,* not; *nōmĕn,* a name: It. *ignominia;* F. *ignominie,* ignominy]: incurring or inflicting disgrace or shame; mean; dishonorable; shameful. Ig'nomin'iously, ad. *-lĭ.* Ignominy, n. *ĭg'nō-mĭn-ĭ,* public disgrace, as on account of dishonorable motives or conduct; shame; infamy; dishonor. Ignomy, n. *ĭg'nō-mĭ, OE.,* for ignominy.—Syn. of 'ignominy': opprobrium; reproach; contempt.

IGNORAMUS, n. *ĭg'nō-rā'mŭs* [L. *ignōrāmus,* we know not, we ignore—the word formerly written by a grand jury on a bill of indictment, when there was not sufficient evidence to find a true bill—hence to *ignore*]: ignorant person; vain pretender to knowledge. Ig'nora'muses, n. plu. *-mŭs-ĕz.* The words now used on a bill are 'Not a true bill,' or 'Not found.'

IGNORANCE, n. *ĭg′nō-răns* [F. *ignorance*—from L. *ignōran′tĭă*, ignorance—from *ignōrans*, not knowing: It. *ignorante:* F. *ignorant*, ignorant]: the want or absence of knowledge. IG′NORANCES, n. plu. *-răns-ĕz*, in *B. of Com. Prayer*, sins committed in or through ignorance. IG′NORANT, a. *-rănt* [F.]: without knowledge or information; uninstructed; illiterate; without knowledge of some particular; unacquainted with. IG′NORANTLY, ad. *-lĭ*. THE IGNORANT, those untaught or uneducated; the unlettered.—SYN. of 'ignorant': illiterate; unlearned; unlettered; uninstructed: untaught, unenlightened; uninformed; unacquainted; unconscious; unaware; unknown; undiscovered.

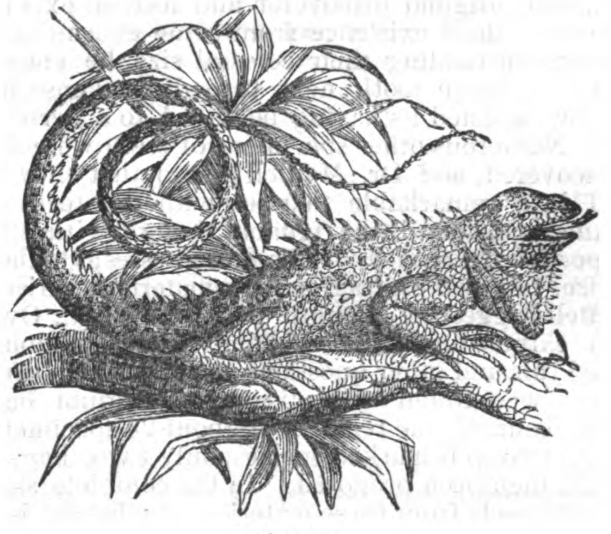
IGNORANCE OF THE LAW (IGNORAN′TIA JU′RIS): held in law to be no excuse for any breach of contract or duty, nor for crime or other offense. It is absolutely necessary to start with this maxim, otherwise it would be quite impossible to administer the law, for if once a contrary maxim were allowed, it would not only be a premium to ignorance, but would lead to endless and abortive inquiries into the interior of a man's mind. Ignorance of a *fact*, however, is a different thing. Another kindred maxim of the law is, that every man intends the consequences of his own act. Thus, if he shoot at or give poison to a person, it is presumed that he intended to kill such person. So, if he leave a trap-door open in a street or thoroughfare, it is held that he intended people to fall into it and be injured. There is, however, a doctrine called *bona fides*, which in the case of petty offenses punishable by justices, often tempers the strict and rigid application of the maxim, *ignorantia juris neminem excusat* (see BONA FIDES, in Law); and even in crimes a judge always takes into consideration, when passing judgment, whether the prisoner or defendant was an ignorant or an intelligent person.

IGNORANTINES, *ĭg-nō-răn′tĭnz* [Fr. *Frères Ignorantins*]: religious congregation of men in the Rom. Cath. Church, associated for gratuitous instruction of poor children in sacred as well as secular learning. It is usually, but incorrectly called, *Brethren of the Christian Schools*. It was founded in Rheims, France, 1679; formerly organized 1683 by the priest Jean-Baptiste de la Salle; approved by Pope Benedict XIII. 1725; and has gradually been introduced into every Rom. Cath. country of Europe. In France, this congregation shared at the Revolution the fate of all the other religious bodies; but the brethren were recalled, and re-established under Napoleon 1803; and were recognized by govt. 1808. They are now exceedingly numerous in France, Italy, and Germany, and have many branches in England and Ireland, and in parts of America. In France they report more than 1,300 schools for young and old, with more than 300,000 pupils under about 8,000 masters. In Ireland they possess, especially in Dublin, Cork, Limerick, Waterford, large educational establishments; and they have published for the use of their schools a series of school-books, designed to combine with secular knowledge information on the subject of religion, specially for Rom. Cath. pupils.

IGNORE, v. *ĭg-nōr'* [F. *ignorer*, to ignore, to be ignorant of—from L. *ignōrārĕ*, to have no knowledge of]: to set aside or reject; to pass over or overlook purposely. IGNOR'ING, imp. IGNORED', pp. *-nōrd'*. See IGNORAMUS.

IGUALADA, *ē-gwâ-lâ'thâ:* town of Spain, in the modern province of Barcelona, about 40 m. w.n.w. of the city of Barcelona, on a rising ground on the left bank of the river Noya. It is for the most part closely built, dark, and dirty; carries on manufactures of cotton and woolen goods, hats and firearms, and is the seat of considerable trade. Pop. abt. 12,000.

IGUANA, n. *ĭg-wâ'nă* [Sp. *iguana*—from a native St. Domingo word. *igōână*]: genus of saurian reptiles, type of the family *Iguanidæ* (*īg-wăn'ĭ-dē*), a family which contains abt. 60 known genera, and many species, and to which belong some of the largest saurians now existing, except those of the crocodile family. Far larger saurians allied to them existed in former geological periods: see IGUANODON. The *Iguanidæ* have a lizard like form and a long tail. The tongue is thick, fleshy, not extensile, and is notched at the tip. They have rows of small teeth on the palate, and their jaw-teeth are remarkable both for their form and for their mode of insertion, not being lodged in distinct sockets, but fixed in a kind of furrow along the internal face of the jaw-bone, adhering by one side of the bony surface of the root. The food of the *Iguanidæ* consists chiefly of leaves and fruits. They are all natives of warm climates. —In the genus I., the back exhibits a row of elevated, compressed, pointed scales along its whole length, continued to the extremity of the tail; while under the throat is a great dewlap-like pouch. The feet have long toes, not



Iguana.

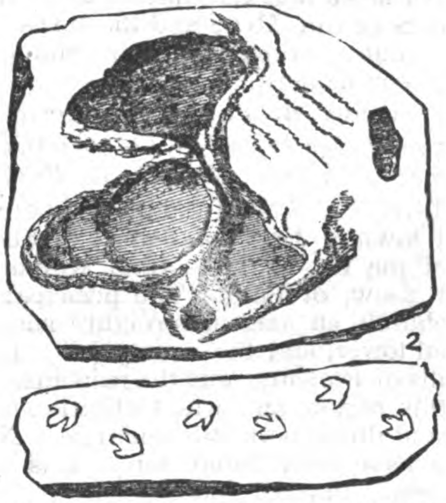
webbed, with sharp claws, well adapted for climbing trees while the compressed tail is the organ of progression used in swimming. The COMMON I., or GUANA, is abundant in the W. Indies and tropical America, living mostly among trees. It attains a length of four or five ft. It is of greenish-yellow color, mottled with green, the tail ringed with brown. It is esteemed a delicate article of food, and is used by all classes of people. It is often caught by means of a noose thrown over its head; dogs have also been trained to hunt it on some of the W. India *keys*, where it has not opportunity of taking refuge in trees. The eggs—about the size of those of a pigeon, but with no hard shell, and laid in the sand—are eaten, and are good food. Other species of I. and nearly allied genera are eaten in tropical America, as the Horned I. (*I. cornuta* or *Metapoceros cornutus*) of Hayti. The true iguanas all are American.

IGUANODON, n. *ig-wăn'ō-dŏn* [Sp. *iguana*, Gr. *odous* or *odonta*, tooth]: genus of remarkable gigantic dinosaurian reptiles, more abundant in the Wealden beds of Kent, Sussex, England, and the Isle of Wight, than any other genus of associated saurians. Their form was probably lizard-like. Their singular structure, differing in many important particulars from any known reptile, long caused great diversity of opinion as to their true position. Dr. Mantell, their original discoverer and learned expounder, first knew of their existence from some enormous bones which notwithstanding their colossal size, he considered reptilian. A large tooth next turned up, whose smooth worn crown attested its having belonged to a herbivorous animal. Numerous other specimens of teeth were after a time discovered, and Dr. Mantell found that they corresponded in a remarkable manner with the teeth of the small American lizard, the iguana, though with striking and important differences. The first guesses as to the creature's size, founded on fragmentary materials, varied vastly: Mantell suggesting a length of 50 to 60 ft., Owen of 28. An extraordinary recent 'find' of iguanodons has simplified this and other questions as to the structure. In 1878, there were found at Bernissart, in Belgium, between Mons and Tournai, the remains of about 23 specimens, belonging to two well-marked species; only two other species having till then been proposed. In the complete skeleton set up at Brussels from these materials, the height is 14 ft. 2 inches; the horizontal length of the body in a half-standing attitude, 23 ft. See *Nature* XXVIII.

The structure of the skeleton is very remarkable. The front parts of both upper and lower jaws were without teeth, and suggest a hollow, beak-like arrangement; possibly the creature had a long prehensile tongue. In many respects there are striking resemblances between the structure of the ornithopod Dinosaurians (of which the *Iguanodontidæ* are a family) and that of birds. The vertebral column had joints slightly concave on both surfaces, yet had lofty neural arches; and the sacrum was composed of five anchylosed joints, a structure found in no other reptile. The two forelegs were small; the hinder limbs were long and strong, raising the body some distance from the ground.

The leg terminated in a three-toed foot, which produced the enormous tridactyle impressions on the argillaceous. Wealden beds that were for some time considered the footprints of huge birds. The I. is supposed to have walked at times on its hind legs, like a bird.

The teeth of the iguanodon, while bearing a general resemblance to those of the iguana, were much more complicated both in external form and internal structure than in any other known reptile. In all other known reptiles, the vertically flat teeth are always sharp edged, and fitted only to cut off the plants on which they feed, but the worn crowns in this animal show that the iguanodon thoroughly triturated its food before swallowing it. It is not known that it possessed scales, or any form of skin-armor.



1. Footprint of Iguanodon, from a footprint 24 inches long, one-sixteenth natural size.
2. Reduced track, showing the arrangement of the footprints.

IGU'VIUM: see **Eugubine Tables**: **Gubbio**.

IH'LANG-IH'LANG: see **Y-lang-Y-lang**.

IHRAM, n. *ē'ram* [Arab.]: the dress worn by Mohammedan pilgrims, consisting in the case of men of two scarfs, one folded round the loins, and the other thrown over the neck and shoulders; in the case of women, of a cloak enveloping the whole body.

IHRE, *ē'rēh*, **Johan**: 1707-80; b. Lund, Sweden, of Scottish extraction: philologist. He was educated at the Univ. of Upsala, where he acquired great reputation, and took the highest honors. He travelled in France and England, was appointed under-librarian to the Acad. of Sciences on his return to Sweden, and rose through a variety of offices to be prof. of belles-lettres and political economy (1748). I.'s principal work is his *Glossarium Suiogothicum* (1769), a work of great erudition, which is regarded as the foundation of Swedish philology. It was published at the cost of the state, which gave I. $10,000 to execute it.

His more than 450 academical disputations are still valuable, especially those on the Mœso-Gothic version of the Gospels by Ulfilas.

I. H. S.: an abbreviation for Jesus (Gr. *ΙΗΣΟΥΣ*)—the H representing the long e. To mark the contraction, the abbreviation was formerly written IH̄C (Greek C = S), which in later times became IH̄S. The H̄ being misunderstood, the idea arose that IHS meant *Jesus Hominum Salvator*, 'Jesus Savior of Men,' and the mark of contraction over the H being thus rendered unmeaning, was turned into a cross, as on modern altar-cloths.

IKU'PA: principal river of Madagascar (q.v.).

IL, *ĭl:* a prefix signifying *not* before adjectives: see IN. *Note.*—In It. *il* = the; Sp. *el* = the; L. *ille* = he.

ILCHESTER, *ĭl'chĕs-tėr* (formerly IVELCHESTER): small and decayed town of England, county of Somerset, in the rich valley of the Yeo or Ivel—from which it derives its name—33 m. s.s.w. of Bath. The principal buildings are the parish church, an ancient structure surmounted by a low octagonal tower, and the county jail. I., supposed to be the Ischalis of Ptolemy, was the principal station of the Romans in this region, and was fortified by them with a strong wall and ditch, both still traceable. Numerous Roman remains have been found here. I. is the birthplace of Roger Bacon. Pop. abt. 800.

ILE-DE-FRANCE, *ēl-dĕh-frŏngss':* one of the old provinces of France, having Paris as its capital, and now mostly comprised in the depts. Seine, Seine-et-Oise, and Oise. During the last century of the Carlovingian dynasty, the Ile-de-F. was possessed by a race of powerful nobles, who latterly took the title of Dukes of France. One of the most able of these was Hugo or Hugues, surnamed Le Blanc, or Le Grand, who, for twenty years previous to his death (956), virtually wielded the sovereign power under the Carlovingian kings Louis IV. and Lothaire. His son, Hugo Capet, eventually became the actual sovereign. See CAPETIAN DYNASTY.

ILEO, *ĭl'ĕ-ō* [L. and Gr. *ilĕŏs*, a severe kind of colic—from Gr. *eilĕō*, I turn or twist: L. *īlĕ*, a gut, the flank; *īlĭă*, the entrails of animals]: in *anat.*, a prefix denoting connection with the intestine called *ileum*, or relation to it. ILEUM, n. *ĭl'ĕ-ŭm*, the lower portion of the small intestines, so called from its numerous convolutions (see DIGESTION, ORGANS OF). ILEUS, n. *ĭl'ĕ-ŭs*, called sometimes ILIAC PASSION: obstruction in the bowels accompanied by vomiting, pain, and fever; intussusception of the bowels. It is regarded by some writers as a distinct disease; but is in reality the closing stage of the severest forms of enteritis, or of colic, and often connected with some irremovable mechanical obstruction. It may indeed occur in any case in which the contents of the bowel cannot make their way onward. The peristaltic action of the intestine is inverted; there is intense vomiting, and even feculent matter is discharged by the mouth. Desperate as the condition of the patient is, his case is not absolutely hopeless; but recovery, when it occurs, is due rather to nature than to art.

I'LETZK, or **ILETZKAÏA ZASHCHITA**: small town and fort in Eastern Russia, on the border of the Kirghiz territory (govt. of Orenburg), on the river Ilek, near its confluence with the Ural; lat. 51° 9′ n., long. 54° 59′ e. The town was founded by Cossack emigrants 1737. It is remarkable for its quarries of rock-salt, richest in Russia. The salt-beds of I. were formerly worked by the native Bashkirs, but since 1754, both the extraction and sale of the salt are monopolized by the govt., and are the source of considerable revenue. All the country round I., especially along the river Solianka, is one continual layer of salt, covered with a sandy or clayey alluvion, 3½ to 4½ ft. thick. The thickness of the salt bed is not yet thoroughly ascertained, notwithstanding many investigations, from Pallas till the present time. The I. salt is considered the best in Russia. On the surface of the bed, cubic blocks of salt are found, pure and transparent like crystal, weighing 3 to 30 lbs. each. Various small articles are manufactured out of such blocks, and the common people ascribe to them a healing virtue in ophthalmic disease. Near I. are two lakes, one of which is salt and warm, the other acid. Pop. of I. (1880) 2,886.

ILEX, n. *ī'lĕks* [L.]: in modern *botany*, the genus of the holly (q.v.), consisting of evergreen trees and shrubs; the *Ilex aquifōlĭŭm*, the common holly, ord. *Aquĭfōlĭācĕæ* *Note.*—In Gaelic, *uile-ioc*=all-heal, is a general name for the Ilex, Ulex, Holly, and Hollyhock, from their supposed medicinal virtues: see Dr. C. Mackay under Ilex.

ILEX is the name also of a tree frequently referred to in the Latin classics, the Evergreen Oak or Holm Oak (*Quercus Ilex*): see Oak. It is a native of most parts of s. Europe and of n. Africa, often attaining large dimensions. It grows in general singly or in small groups, and thrives in the vicinity of the sea. Its leaves are ovate-oblong, acute, leathery, hoary beneath; but they vary much in some respects, from the size of a sloe leaf to that of a beech, and from being very spiny at the edge to perfect evenness. It is a very ornamental tree, less planted than it deserves. Its wood is very hard and heavy, tough, durable, and useful, particularly for axles, pulleys, screws, and whatever is to be subjected to much friction. The acorns are of various quality, sometimes bitter and sometimes sweet and eatable.

ILFRACOMBE, *ĭl'fra-kôm:* small market-town, seaport, and watering-place of England, on the n. coast of the county of Devon, finely situated amid picturesque, irregular hills, on a cove or inlet of the Bristol Channel, 11 m. n.n.w. of Barnstaple. The harbor is formed by ramparts of rock, and furnished with a light-house, and a pier 850 ft. in length. The bathing establishment is a Doric building, erected here 1836, and supplied with sea-water from the shore by means of a tunnel. The town is dependent chiefly on its wealthier residents and its summer visitors;

but an active fishery and coasting-trade also are carried on. Pop. (1871) 4,721; (1881) 6,043.

ILHAVO, *ēl-yâ'vō:* town of Portugal, dist. of Aveiro, near the Atlantic. Pop. (1878) 7,762.

ILI, or EELEE, *ē'lē:* river in central Asia, rising on the n. side of the Thian Shan Mountains, about lat. 42° n. and long. 81° e., flowing n e. through the Kushbegi empire in Chinese Tartary, then n.n.w. past the town of Kooldja, and emptying into Lake Balkash, on the frontier of Siberia, after a course of 600 m. The valley of the I. was formerly the route of Oriental nations invading Europe, and in late years has been utilized by the Russians as a convenient approach to China.

ILIAC, a. *ĭl'ĭ-ăk* [L. *īlĭă*, the flank, the entrails]: belonging to the bone called *ilium*. ILIAC PASSION (see ILEUS, under ILEO). ILIAC REGIONS, the sides of the abdomen between the ribs and the hips. ILIUM, n. *ĭl'ĭ-ŭm*, the large, partly-flattened bone, forming the principal part of the pelvis, and entering into the composition of the hip-joint (see PELVIS). ILIO, *ĭl'ĭ-ō*, in *anat.*, a prefix denoting connection with the iliac bone. ILIAC ARTERIES, arteries pertaining to the pelvis. The aorta (q.v.) divides at its lowest point—usually on the left side of the body of the fourth lumbar vertebra—into the two common iliac arteries, which pass downward and outward on each side to the margin of the pelvis for about two inches and a half, and then divide into the external and internal iliac artery of either side. The external iliac passes obliquely downward and outward to the femoral arch, when it enters the thigh, and becomes the femoral artery. The internal iliac is a short vessel, about an inch and a half in length, which divides into an anterior and a posterior trunk. The anterior trunk divides into several branches, which supply the bladder, the rectum, the generative organs, and muscles both within and on the outside of the pelvis, with arterial blood; while the branches of the posterior trunk mainly supply muscles within and on the outside of the pelvis. For the importance of the internal iliac artery in carrying on the circulation in uterine life, see FŒTUS.

ILIAD, n. *ĭl'ĭ ăd* [from L. *Ilĭŭm*, or Greek *Ilĭŏn*, Troy]: the chief epic poem of the anc. Gr. poet, Homer, relating to the siege of Ilium or Troy.

ILIJATS': see ILIYATS.

ILINIZA, *ē-lē-nē'sâ*, or ILINISSA, *ē-lē-nĭs'sâ:* volcano with two peaks, 17,380 ft. high; one of the Cordilleras in e. Ecuador, S. America, 10 m. s. of Quito.

ILION, *ĭl'ĭ-on:* village in German Flats tp., Herkimer co., N. Y., on the Mohawk river, Erie canal, and the N. Y. Central railroad; 11½ m. e.s.e. of Utica, 83 m. w. of Albany. It contains 6 churches, several public schools, 1 national bank, an acad, extensive manufactories of firearms, sewing-machines, agricultural implements, and type-writing machines, and street railroad connections with Mohawk and Herkimer. Pop. (1870) 2,876; (1880) 3,711.

ILʹIOS, or Ilium: ancient city: see **Troy.**

ILIS'SUS: see Athens: Attica.

ILIUM, n.: see under Iliac.

ILIYATS, or Ilijats, *ē-lē-yâts'*, or Eeliauts, *ē-ĕl-yawts':* tribe of Turkish, Arabic, and Kurdish descent, nomadic in habits, Mohammedan in faith, and found largely in Persia, Khiva, and Turkistan. They dwell in tents, change their encampments with the seasons, breed large herds of sheep and cattle, are given to plunder and robbery, and are governed by a royal family of the Kajar tribe. The tribes of the Khiva region number more than 200,000 persons, and the Kashkai tribe occupy 25,000 tents.

ILK, n. *ĭlk* [AS. *ylc*, the same, ilk: Goth. *svaleiks*, so like: AS. *swilc*, such, the like]: in *OE.*, the same; the same place; in *Scot.*, an addition put to a gentleman's name when the name of his estate is the same with his surname, as Balfour of that *ilk*—that is, Balfour of Balfour.

ILKESTON, *ĭl'kĕs-ton:* thriving market town of England, county of Derby, 10 m. n.e. of the town of Derby, on an eminence in the valley of Erewash. I. is known by the repute of its alkaline spring and baths. It has manufactures of hosiery and lace, with coal and iron works in the vicinity. Pop. (1871) 9,662; (1881) 14,119.

ILL, a. *ĭl* [Dan. *ilde;* Sw. *illa;* Icel. *illr*, ill, badly: Goth. *ubils;* Ger. *übel;* AS. *yfel*, evil: comp. Gael. *iol*, sick]: bad; evil; contrary to good; unfortunate; unfavorable; sick; unwell; cross; surly; ugly or repulsive, as ill looks; suspicious: Ad. as the first element of a compound, signifying 'a negation' or 'some bad quality connected with it'; not well; badly; not easily: N. evil; misfortune; wickedness. Ill'ness, n. sickness; indisposition. Ill-blood, hostile feeling; resentment. Ill-bred, a. badly taught; rude. Ill-breeding, n. roughness and rudeness of manners; unpoliteness. Ill-faur'd, *ĭl-fawrd'*, in *Scot.*, ill-favored; having a cross, forbidding aspect; ugly. Ill-fashioned, *-făsh'ŭnd*, in *OE.*, ill-mannered; having a cross, quarrelsome temper. Ill-favored, ill-looking; ugly; deformed. Ill-hadden, *-hăd'n*, in *Scot.*, ill-holden; not kept under restraint. Ill-nature, n. *ĭl-nā'tūr* or *-chûr*, habitual bad temper; crossness. Ill-na'tured, a. *-tūrd*, habitually bad-tempered; crabbed; unamiable; unkindly; surly. Ill-na'turedly, ad. *-lĭ*. Ill-omened, attended with dismal forebodings or bad omens. Ill-redd-up [Scot. *red*, to put in order]: in *Scot.*, in a state of disorder. Ill-set, evil-disposed; spiteful; ill-natured. Ill-starred, influenced by evil stars; fated to be unfortunate. Ill-suppressed, subdued or suppressed with difficulty, as indignation. Ill-tempered, crabbed; peevish Ill-time, a time unsuitable for the thing. Ill-timed, a. said or done at an unsuitable time. Ill turn, an unkind or injurious act; a slight attack of illness. Ill-wared, *-wārd*, in *Scot.*, laid out or spent to little or no good, as money. Ill-will, hostile feeling; enmity. *Note.*—In most cases, when *ill* is used as a prefix or the first element of a compound, it would be well to unite the two words by a hyphen, thus, *ill-conditioned*, ***ill-assorted.*** *ill-devised*, etc.—SYN. of 'ill, a.': disagreeable; wicked; wrong; naughty; iniquitous; diseased; disordered; indisposed; unpolished; rude; incorrect; inelegant; crabbed; peevish;—of 'illness': disease; disorder; badness; malady, in *OE.*, wickedness; iniquity; unrighteousness.

ILLAPSE, n. *ĭl-lăps'* [L. *illapsus*, a slipping or gliding in—from *il*, in or on; *lapsus*, a falling, a slipping]: a sliding in; a falling on.

ILLATIVE, a. *ĭl'lă-tĭv* [L. *il*, in or on; *lātus*, brought or carried]: that may be inferred; that denotes an inference, as an *illative* word or particle, *then*, *therefore*, etc.: N. that which denotes illation or conclusion. IL'LATIVELY, ad. *-lĭ*. ILLATION, n. *ĭl-lā'shŭn* [F.—L.]: a conclusion drawn from premises; an inference; an imperfect syllogism. ILLATIVE-CONVERSION, n., in *logic*, that in which the truth of the converse follows from the truth of the proposition given; as the proposition, Religion is the truest wisdom, becomes by illative-conversion, The truest wisdom is religion. ILLATIVE-SENSE, n. that faculty of the mind by which it forms a judgment on the validity of an inference.

ILLAUDABLE, a. *ĭl-lawd'ă-bl* [L. *illaudābĭlĭs*, not worthy of praise—from *il*, not; *laudo*, I praise]: in *OE.*, unworthy of praise; blamable. ILLAUD'ABLY, ad. *-ă-blĭ*.

ILLE-ET-VILAINE, *ēl-ā-vē-lān'*: maritime department in the n.w. of France, formed out of a portion of the old province of Bretagne. It is quadrangular in shape, between the English Channel and the dept. of Loire-Inférieure; 2,590 sq. m., or 1,646,670 sq. acres, of which 1,016,580 acres are arable land. It is watered chiefly by the rivers from which it derives its name—the Vilaine, and its tributary, the Ille. The usual grain-crops are raised in sufficient quantity for the wants of the population. Flax and hemp are extensively produced, and the cider of this district is esteemed the best in the country. Cattle are reared in great numbers, iron mines are worked, and great varieties of linen and woolen fabrics are manufactured. The dept. is divided into six arrondissements—Rennes. Fougères, Montfort, St. Malo, Vitré, and Redon. Rennes is the cap., and St. Malo the principal seaport. Pop. of dept. (1881) 611,151.

ILLEGAL, a. *ĭl-lē'găl* [F. *illégal*—from L. *illēgālĭs*—from L. *il*, not; *lēgālĭs*, legal—from *lex*, law]: contrary to law; unlawful. ILLE'GALLY, ad. *-lĭ*. IL'LEGAL'ITY, n. *-găl'ĭ tĭ* [F. *illégalité*]: the state of being contrary to law; unlawfulness. ILLE'GALIZE, v. *-lē'găl-īz*, to render unlawful. ILLE'GALI'ZING, imp. ILLE'GALIZED, pp. *-īzd*.

ILLEGIBLE, a. *ĭl-lĕj'ĭ-bl* [L. *il*, not; *legĭbĭlĭs*, that may be read—from *lĕgō*, I read]: that cannot be read; not easily read; defaced. ILLEG'IBLY, ad. *-blĭ*. ILLEG'IBIL'ITY, n. *-bĭl'ĭ-tĭ*, the quality of being not readable or not easily read.

ILLEGITIMATE, a. *ĭl'lĕ-jĭt'ĭ-māt* [L. *il*, not; *legĭtĭmus*, lawful]: born out of wedlock; contrary to law; not genuine:

V. to prove to be born out of wedlock; to bastardize. IL'LEGIT'IMATING, imp. IL'LEGIT'IMATED, a. *-mā-tĕd*, proved to have been born out of wedlock. IL'LEGIT'IMATELY, ad. *-lĭ*. IL'LEGIT'IMACY, n. *-mă-sĭ*, the state of being born out of wedlock; bastardy: see LEGITIMACY: BASTARDS AND BASTARDY. IL'LEGITIMA'TION, n. *-mā'shŭn*, state of not being born in wedlock; want of genuineness.

ILLIBERAL, a. *ĭl-lĭb-ėr-ăl* [L. *il*, not; *libĕrālĭs*, befitting a freeman, liberal]: of a contracted mind; not liberal; niggardly; mean; wanting charity in judging. ILLIB'ERALLY, ad. *-lĭ*. ILLIB'ERAL'ITY, n. *-ăl'ĭ-tĭ*, narrowness of mind; meanness.

ILLICIT, a. *ĭl-lĭs'ĭt* [F. *illicite*, illicit—from L. *illĭcĭtus*, not allowed—from L. *il*, not; *lĭcĭtus*, permitted, allowed: It. *illicito*]: unlawful; prohibited by law. ILLIC'ITNESS, n. *-nĕs*, unlawfulness. ILLIC'ITLY, ad. *-lĭ*.

ILLICIUM, *ĭl-lĭs'ĭ-ŭm:* genus of trees of nat. ord., *Magnoliaceæ*, having flowers with three or six petal-like sepals, numerous petals arranged in several rows, and numerous stamens and pistils; the capsules arranged in a star-like form opening upward, and each containing a single seed. The species are few but very widely distributed. The most important is *I. anisatum*, the fruit of which is known as Star Anise, or Chinese Anise: see ANISE. This tree is held in high estimation among the Japanese, and is planted near their temples, as their gods are supposed to delight in it.—Among the other species is *I. Floridanum*, a shrub with fine pendant clusters of dark purple flowers, native of Florida and Louisiana, of which the leaves are very fragrant, the capsules also smelling of anise, though more faintly than those of the Chinese tree. Similar in fragrance is *I. parviflorum*, another Floridian species.

ILLIMANI, *ēl-yē-mâ'nē:* one of the principal mountains of the Bolivian Andes: see ANDES.

ILLIMITABLE, a. *ĭl-lĭm'ĭt-ă-bl* [L. *il*, not; *limĭtārĕ*, to bound or limit]: that cannot be limited or bounded. ILLIM'ITABLY, ad. *-ă-blĭ*. ILLIM'ITEDNESS, n. exemption from all bounds.—SYN. of 'illimitable': boundless; limitless; unbounded; unlimited; vast; immense; immeasurable; infinite.

ILLINOIS, *ĭl-ĭ-noy'* or *ĭl-ĭ-noys'*: state, one of the United States of America, 8th in order of admission into the union, 4th in population and value of manufactures, and 1st in extent of railroads and value of agricultural products; known as the 'Prairie State,' and named from an Indian tribe, 'a superior class of men.'

Location and Area.—I. is in the upper Miss. valley, lat. 36° 59'—42° 30' n., long. 87° 35'—91° 40' w.; bounded n. by Wis., e. by Lake Michigan, Ind., and Ky., s. by Ky. and Mo., w. by Mo. and Io.; extreme length 385 m., extreme width 218 m., average width 156 m.; 56,650 sq.m. (36,256,000 acres); greatest elevation above the sea 1,150 ft.; extent of navigable streams 4,000 m.; cap. Springfield.

Topography.—The surface is nearly level, the lowest part being 400 ft. above the sea, and the grand prairie about 500 ft. It is in the main high table-land, with an abundance of prairie and woodland. The drainage is by the Miss. river and its tributaries, the Ohio, Kaskaskia, Illinois, and Rock rivers, with their smaller affluents. The I. river is the largest wholly within the state, having a flow of nearly 500 m., and being formed by the Des Plaines of Wis. and the Kankakee of Ind. Its chief rival is the Kaskaskia, which flows nearly parallel with it 250 m. The lake system is almost confined to Lake Pishtaka in the n.e., and Peoria Lake, a widening of I. river. Interesting surface features are the Miss. river bluffs, also remains of the mound builders, and several caverns, particularly that near Chester.

Climate.—In the n. the heat of summer and the cold of winter are intense, but the summer temperature is agreeably modified by continuous breezes. On an average, there are 240 clear days to 120 cloudy in the year. In the centre of the state—about lat. 40° n.—the mean temperature of the year is 54°, with summer rise (mean) to 77°, and winter fall to 33½° F. At Beloit in the extreme n. the mean annual temperature is 47½°, and at Cairo in the extreme s., 58½°. The prevailing winds are n., n.w., s., and s.w. The climate generally is considered healthful. Paludal or marsh fevers prevail in the low southern section, but the prairie lands are free from endemic diseases. Good drainage and cultivation have done much to relieve the state generally of disorders of malarial origin.

Geology.—The soil is of diluvial origin on almost continuous coal measures. The coal is bituminous. The sec. of the bureau of labor statistics reported 1884 the number of coal producing counties 49, mines 639, acres of land owned or controlled by mine proprietors 110,893, acres worked out 12,329, men employed 23,939, production 1883, 10,508,791 tons, increase over 1882, 1,393,138, value of product $15,310,521, cap. employed $10,396,540, estimated capacity of annual production 21,035,435 tons, and casualties of all kinds (1883) 360. The area of the coal measures was estimated at 45,000 sq.m. Lead ore bearing silver is found in Jo Daviess co., and is profitably worked; salt abounds near the head waters of Big Muddy river, Saline creek and Little Wabash river in the s.; sulphur and chalybeate springs are numerous in Jefferson co.; limestones for burning and building, drab freestones, variegated marble, and gypsum are included in the mineral resources; and oak, black walnut, ash, elm, sugar maple, locust, linden, hickory, pecan, yellow poplar, yellow pine, beech, cedar, cottonwood, sycamore, and persimmon are among the forest growths, while the fruits comprise apple, cherry, grape, peach and plum.

Zoològy.—The rapid settlement of the state has almost annihilated its game animals. Two species of the hare, the wild turkey, prairie hen, some grouse, a few foxes, the gopher, and squirrel are almost the only wild animals left: deer, bear, wild-cat, and panther—once numerous—are now rarely found. There is an abundance of small game birds, and the shallow lakes in the n.e., as well as some of the rivers, still yield large quantities of white fish, lake trout, and black bass.

Agriculture.—Of the entire acreage of the state 90 per cent. is considered susceptible of the highest cultivation. In 1880 there were 26,174,566 acres of improved, and 8,204,503 of unimproved lands. The improved lands were cultivated as follows: wheat, 2,702,380 acres; corn 7,592,152; oats 1,703,843; meadows 2,267,945; other field products 567,890; inclosed pasture 4,242,713; orchards 293,593; and woodland 3,708,567. The products were: corn 240,452,896 bushels, worth $86,563,043; wheat 60,958,757, $57,910,819; rye, 3,049,860, $2,226,398; oats 62,946;510, $18,254,488; barley 1,109,425, $776,597; buckwheat 259,840, $213,069; potatoes 11,193,750, $6,156,562; tobacco, 3,912,948 pounds, $195,647; and hay 2,595,530, $21,672,675; value of total products $193,969,298. The live stock comprised 1,067,220 horses, 124,527 mules, 709,308 milch cows, 1,222,947 oxen and other cattle, 1,155,232 sheep, and 3,202 swine; total value $141,501,394. In 1885 corn was raised on 8,559,036 acres, and yielded 268,998,000 bushels, worth $75,319;440; hay 3,306,250 acres, 4,298,125 tons, $31,591,219; oats 3,490,081 acres, 107,968,000 bushels, $25,912,320; wheat 1,255,905 acres, 10,683,000 bushels, $8,653,230; potatoes, 142,198 acres, 12,371,000 bushels, $5,195,915; rye 181,277 acres, 2,302,000 bushels, $1,220,176; barley 41,361 acres, 1,001,000 bushels, $570,534; buckwheat 15,491 acres, 194,000 bushels, $123,928; tobacco 5,908 acres, 4,963,000 pounds, $446,645; value of total products $149,033,407. In the crop year 1889 the oat acreage was 3,914,760, and the yield 133,101,840 bushels, the largest acreage and crop of any state. The Board of Live Stock Commissioners created by legislative acts 1885, 87 reported for 1888, number of horses 998,031, worth $24,826,145; cattle 2,423,484, $17,229,377; swine 1,966,700, $2,793,326; mules and asses 100,613, $2,517,970; sheep 554,910, $534,769; total animals 6,043,738, value $47,901,587.

Manufactures.—I. had (1880) 14,549 manufacturing establishments, employing 144,727 hands, using a capital of $140,652,066, paying in wages $57,429,085, using materials valued at $289,826,907, and yielding products valued at $414,864,673. The chief industry according to capital employed was the manufacture of flour and grist-mill pro ducts, which employed a capital of $13,579,680, paid wages $1,868,124, materials $41,486,756, and received $47,471,558 for products. Next was slaughtering and meat packing, which employed a capital of $12,019,980, paid wages $4,077,617, materials $84,649,718, and received $97,891,517 for products. Then followed agricultural implements, capital $11,306,955, wages $3,186,999, materials $6,722,930, products $13,498,575; foundries and machine-shops, capital $7,568,359, wages $3,644,369, materials $7,107,553, products $13,515,791; men's clothing, capital $7,135,533, wages $3,929,964, materials $12,809,297, products $19,356,849; iron and steel, capital $6,460,620, wages $2,508,718, materials $14,977,145, products $20,545,289; malt liquors, capital $6,098,835, wages $754,510, materials $3,261,272, products $5,798,109; printing and publishing, capital $3,625,400, wages $2,401,894, materials $2,807,361, products $7,114,039; furniture, capital $3,554,130, wages $2,497,778, materials $3,607,313, products $7,644,638; carriages and wagons, capital $3,466,830, wages $1,429,705, materials $2,391,111, products $5,003,053; distilled liquors, capital $3,437,616, wages $934,751, materials $10,066,860, products $14,600,760; and lumber, capital $3,295,483, wages $787,867, materials $3,144,905, products $5,063,027. In 1885 the introduction of bituminous coal was 9,791,874 tons; pig iron 327,977; steel 371,239, and the state rose to the rank of 2d among the states in steel manufactures, and 3d in pig-iron production. More recent reports indicate that of the total production of steel in the various states Penn.'s percentage has of late been steadily declining, while I. has made great gains.

Commerce.—I. is (1889) comprised in one customs and five internal revenue districts. The foreign commerce is nearly all in grain, and the domestic comprises grain and manufactured articles, which are shipped by rail and water-routes in all directions. The internal revenue collections in the fiscal year 1888-9 were $31,007,419, the 5th dist. collecting more than any other dist. in the country, $19,322,265.

Railroads.—The development of the railroad system of I., which has brought it to rank first among the states in this respect, has been (1846) 22 m., (1850) 111, (1855) 887, (1860) 2,790, (1865) 3,157, (1870) 4,823, (1875) 7,109, (1880) 8,000, (1885) 12,000, (1888) 13,000. In 1888 the new mileage completed was 346. There were then 61 corporations owning or controlling the railroads, employing 56,000 persons, and paying in wages $33,000,000. The total cost of construction and equipment exceeded $330,000,000; operating expenses were more than $38,000,000; state and local taxes aggregated $2,739,612; 32,000,000 passengers were carried on receipt of more than $17,000,000, and 53,000,000 tons of freight on about $39,000,000. The railroad mileage of I. is greater than that of any other state, and includes the great trunk lines, the I. Central, Chicago and Northwestern, Chicago Rock Island and Pacific, and more than 50 other well-known lines. The first railroad in the state was the Sangamon and Morgan, part of which was opened to traffic 1839; and the second, the Galena and Chicago, was begun

1849. The exceptional advantage of I. over most of the states, in water-route communications by the great lakes and the O. and Miss rivers, retarded railroad building till after the civil war, and directed public attention more to the improvement of those routes. The construction of the I. and Mich. canal (q.v.) relieved the commerce of the waters somewhat; but the rapidly increasing volume of grain products necessitated the energetic railroad extension above noted.

Religion.—In 1887 there were about 6,700 churches in I. with more than 800,000 members. The Meth. Episc. Church led with 790 ministers, 1,535 churches, and 128,181 members; followed by the Bapt., 926 churches, and 68,100 members; Christians (Disciples) 650 ministers, 775 churches, and 85,250 members; Presb., 484 churches, and 42,890 members; and Rom. Cath., 470 churches, and 390,000 members (population). Reports for 1888 gave the Bapt. second place, with 712 ministers, 1,002 churches, 82,974 members, 728 Sunday schools, 6,777 officers and teachers, and 56,337 scholars. The Presb. Church in the U. S. A. reported 11 presbyteries, 388 ministers, 480 churches, 49,658 members, 449 Sunday schools, 6,508 officers and teachers, and 51,849 scholars. The Rom. Cath. Church had the archdiocese of Chicago, established 1844 and created an archbishopric 1880, in which there were 286 priests, 207 churches, 3 colleges, 18 academies, 73 convents, 6 hospitals, and 3 orphan asylums; the diocese of Alton, formerly Quincy, erected 1853, transferred 1857, in which there were 180 priests, 201 churches, 2 colleges, 9 academies, 2 monasteries, and 13 hospitals; the diocese of Peoria, established 1877, in which there were 113 priests, 163 churches, 9 academies, 1 monastery, 5 hospitals, and 1 orphan asylum; and the diocese of Belleville (no reports at hand): totals (except Belleville) 579 priests, 571 churches, 5 colleges, 36 academies, 73 convents, 4 orphan asylums, 4 monasteries, 19 other charitable institutions, 58,050 children in parochial schools. The archdiocese of Chicago contained a Rom. Cath. pop. of 400,000. The Congl. Churches reported 294 ministers, 261 churches, 29,867 members, and 42,283 Sunday-school scholars; the Prot. Episc. 138 ministers, 187 parish missions, 16,203 communicants, 1,162 Sunday-school teachers, and 11,335 scholars, with the dioceses of Chicago (organized 1835), Quincy (1877), and Springfield (1877) comprising the province of I.; the Universalist 78 parishes, 62 churches, 3,030 members, 58 Sunday-schools, and 4,061 scholars. The Unit., and Free-Will and Seventh-Day Bapt. Churches reported a smaller growth.

Education.—In 1888 there were 1,118,472 children of school age (6–21) in the state, of whom 751,349 were enrolled pupils, and of these 518,043 were in average daily attendance. The total expenses of the public schools for the year were $10,661,017, of which $6,714,516 were salaries paid teachers. Excluding the Univ. of I. the permanent productive school funds aggregated $10,383,132. During the school year 1886–7 the state had 24 colleges and universities, with 57 instructors and 2,157 students in the preparatory departments; and a faculty aggregate of 252, with 17 additional instructors and lecturers, and 2,812 students in the collegiate. The income from productive funds was $86,032, amount of the same $1,973,553, and receipts from tuition fees $167,187. There were 116,195 volumes in the college libraries, and the value of grounds, buildings, and apparatus was estimated at $2,399,597. There are two public normal schools supported by the state and one by co. appropriations, of which the State Normal Univ. at Normal (founded 1857) is the oldest and most largely attended. This institution includes beside the normal dept., high school, grammar, and primary grades in the model dept. The S. Ill. Normal Univ. at Carbondale, was given a new building 1887, and has 3 departments; a normal univ., with courses of study occupying 4, 3, and 2 years respectively, a preparatory normal course of one year, and a training dept. The Cook Co. Normal School, in Normal Park, has a professional training class, and 4 high school classes representing the usual 4 grades in an English high-school course. Pupils are admitted to the professional training class who have diplomas from colleges and high schools. Aurora, Moline, and Springfield have normal training classes for their teachers, and teachers' institutes, regular meetings, state, district, and co. assocs., and reading circles, are numerous, well attended, and productive of much good. There is a total teaching force in the state of 22,925, 7,462 males and 15,463 females. The kindergartens nnmber 48, with 157 teachers and 2,684 pupils, and 4 training schools. There are 5 institutions for the superior instruction of women, with 17 male and 48 female instructors, 626 students, 5,000 vols. in the libraries; grounds, buildings, and apparatus worth $375,000. The Univ. of Ill. is endowed with the national land grant: see ILLINOIS, UNIVERSITY OF. The full amount received from the state since the establishment of land grant colleges (act of congress 1862) was $499,550, and from benefactions $306,400.

The various colleges of liberal arts are: Hedding College, Abingdon, chartered 1875, organized 1855 (Meth. Episc.); Ill. Wesleyan Univ., Bloomington, chartered 1850 (Meth. Episc.); St. Viateur's College, Bourbonnai's Grove (Rom. Cath.); Carthage College, Carthage, 1870 (Luth.); St. Ignatius College, Chicago, 1870 (Rom. Cath.); Eureka College, Eureka, 1855 (Christian); Northwestern Univ., Evanston, 1851 (Meth. Episc.); Ewing College, Ewing, 1874 (Bapt.); German-English College, Galena, 1880 (Meth. Episc.); Knox College, Galesburg, 1837 (Congl. and Presb., though non-sect.); Lombard Univ., Galesburg, 1851 (Univ.); Ill. College, Jacksonville, 1835 (Congl. though non-sect.); Lake Forest Univ., Lake Forest, 1856 (Presb.); McKendree College, Lebanon, 1835 (Meth. Episc.); Lincoln Univ., Lincoln, 1865 (Cumb. Presb.); Monmouth College, Monmouth, 1857 (Unit. Presb.); Northwestern College, Naperville, 1865 (Evang.); Chaddock College, Quincy, 1878 (Meth. Episc.); St. Francis Solanus College, Quincy, 1873 (Rom. Cath.); Augustana College, Rock Island, 1865 (Luth.); St. Joseph's Diocesan College, Teutopolis, 1881 (Rom. Cath.); Shurtleff College, Upper Alton, 1835 (Bapt.); Westfield College,

Westfield, 1865 (Unit. Breth.); and Wheaton College, Wheaton, 1861 (non-sect.). There are 34 free lending libraries in the state with 312,004 vols.; 4 free reference, with 62,000 vols.; 3 attached to the public school system with 4,340 vols.; 8 free corporate lending, with 35,193 vols.; and 10 belonging to societies, assocs., lodges, clubs, etc., with 40,775 vols. There are also 5 educational publications.

The special educational and charitable institutions are the Ill. Institute for the education of the Deaf and Dumb (Jacksonville, 1840); Ill. Institute for the Education of the Blind (Jacksonville, 1848); Ill. Charitable Eye and Ear Infirmary (Chicago); Ill. Institute for the Education of Feeble-minded Children (Jacksonville, 1865); Ill. Soldiers' Orphans' Home (Normal, 1865); Ill. State Reform School (Pontiac, 1870); and the Northern (Elgin, 1868), Eastern (Kankakee), Central (Jacksonville, 1847), and Southern (Anna) Hospitals and Asylums for the Insane. In 1886–7 the state spent $3,800,250 on its charitable institutions.

Illiteracy.—Persons 10 years old and upward enumerated (1880) 2,269,315, unable to read 96,809, unable to write 145,397, whites unable to write 132,426; foreign-born whites enumerated 568,264, unable to write 12,612; whites 10–14 years old enumerated 357,748, unable to write 19,413, males 11,180, females 8,233; whites 15–20 years old enumerated 394,785, unable to write 13,657, males 7,619, females 6,038; whites 21 years old and upward enumerated 1,481,945, unable to write 99,356, males 44,536, females 54,820; colored persons 10 years old and upward enumerated 34,837, unable to write 12,971; colored 10–14 years old enumerated 5,203, unable to write 1,389, males 736, females 653; colored 15–20 years old enumerated 5,307, unable to write 1,185, males 598, females 587; colored 21 years old and upward enumerated 24,327, unable to write 10,397, males 5,271, females 5,126.

Finances and Banking.—I. has no bonded debt. In 1885 the receipts were $3,500,000, expenditure $3,000,000; and 1886, Oct. 1—1888, Sep. 30, receipts $14,211,245, expenditures $10,372,028. In 1889 there were 183 national banks (cap. $30,199,000), 20 state banks (cap. $3,641,500), 449 private banks, and 3 savings banks beside those included in state and private banks.

History.—The territory now included in I. was discovered by Jacques Marquette (q.v.), the French Jesuit priest and missionary, and Louis Joliet (q.v.), explorer, who led a small party from Quebec early in 1673. They entered the Miss. river at the mouth of the Wis. river, reached I. June 20, and descended nearly to the mouth of the Ark. river July. Six years afterward Robert La Salle (q.v.), then recently appointed gov. of Fort Frontenac, built a vessel on Lake Erie, began a voyage of discovery, passed through Lakes Huron and Michigan, reached the I. river, built a fort on the site of Peoria, and returned to Canada 1680. In 1682 he made a second voyage, taking with him a considerable number of Canadians, made settlements at Kaskaskia, Cahokai and other river towns, and proceeded thence to the mouth of the Miss. river. The colonists thrived in their new home, became intimate with the Indians, and were visited by Jesuit missionaries early in the 18th c. The French claimed jurisdiction over the region by virtue of discovery, and it was considered a portion of the terr. of La. till 1765, when by the terms of the treaty of Paris, ratified 1763, it became a British possession, with all the country e. of the Miss. river, and was subsequently created a co. of Va. The region had prosperity and peace for many years. Its share in the revolutionary war was almost confined to the capture of the British posts of Vincennes and Kaskaskia by Gen. George Rogers Clarke (q.v.), 1778, July 4. In 1784 all the terr. n.w. of the O. river and e. of the Miss. belonging to Va. was ceded to the federal govt., and this region, by act of congress 1787, July 13, was erected into the Northwest Terr. and placed under a single govt. This enormous terr. was subdivided 1800, and what is now I. formed a part of the Indian Terr. till 1809, when the Terr. of I. was organized from the present I. with Wis. and part of Minn. The seat of govt. was located at Kaskaskia, and Ninian Edwards was appointed the first gov. About this time ill feeling between the Indians and settlers began to threaten open hostility, but no outbreak occurred till 1812, Aug., when the Indians made an attack on the fort at the mouth of the Chicago river, and not only massacred nearly all the garrison, but many settlers in the vicinity. Prompt and severe punishment kept the Indians comparatively quiet till 1831, when Black Hawk, chief of the Sacs, who had removed to the present Io., recrossed the river, and attacked the whites. He was speedily checked and apparently subdued; but though he had sued for peace and reaffirmed the treaty with the govt. of 1804, he suddenly reappeared 1832, Apr., and waged a brief but bloody and hopeless war. Between these periods I. gained largely in population from the e. states, and with its present limits was admitted as a state into the union 1818, Dec. 3. Its population as a separate terr. (1810) was 12,282, and as a state (1820) 55,211, (1830) 157,445. In 1834 congress made an appropriation for the improvement of the harbor of Chicago; 1835 the I. and Mich. canal (q.v.) was projected, and the state bank organized; 1836 ground was broken for the canal; and 1840 the capital was removed to Springfield, and the Mormons removed from Mo. to Nauvoo, I., began erecting a temple, and conducting themselves so offensively that after their leaders, Joseph and Hyrum Smith, had been arrested, put in Carthage jail, and there killed by the populace 1844, June 27, the whole community was expelled from the state. I. contributed 6 regts. for service in the Mexican war. In 1848 the I. and Mich. canal was completed at a cost of $6,409,509; and 1850 immigration received new stimulus through a munificent congressional land grant in aid of the construction of the Ill. Central railroad. During the civil war I. furnished 259,092 men to the union army, and lost, killed in action 5,888, died of wounds 3,032, died of disease 19,496, died in prison 967, lost at sea 205, total loss 29,588. Since then the chief events have been the great fire in Chicago 1871, Oct., when nearly

18,000 buildings were destroyed, 300 lives lost, 100,000 people rendered homeless, property losses $192,000,000; and the anarchist riot in Chicago 1886, May 3. The first state constitution continued in force till 1848, when a second was adopted, and this gave way to the third and present instrument 1870.

Government.—The executive authority is vested by the constitution in a gov., elected for 4 years, salary $6,000 per annum; the legislative in a general assembly comprising a senate of 51 members elected for 4 years, and a house of representatives of 153 members elected for 2 years, salary of each $5 per day, mileage 10c., and $50, biennial sessions; and the judicial in a supreme, circuit, and co. courts, and the usual justices of the peace, and magistrates. Supreme court judges are elected for 9 years, circuit court 6, and co. court 4. The chief justice is elected by his associates, and receives $5,000 per annum. The sec. of state receives $3,500; treas., $3,500; auditor, $3,500; attor.gen. $3,500; pension agt. $4,000; 8 collectors of internal revenue $2,125—$4,500; collector of customs, $7,000; appraiser, $3,000; and examiner $2,000. There are 17 presidential and 173 other post offices.

The successive govs. with their terms of service since the admission of the state into the union are as follows: Shadrack Bond 1818–22; Edward Coles 1822–6; Ninian Edwards 1826–30; John Reynolds 1830–4; Joseph Duncan 1834–8; Thomas Carlin 1838–42; Thomas Ford 1842–6; Augustus C. French 1846–53; Joel A. Matteson 1853–7; William H. Bissell 1857–61; Richard Yates 1861–5; Richard J. Oglesby 1865–9; John M. Palmer 1869–73; Richard J. Oglesby 1873; John L. Beveridge 1873–7; Shelby M. Cullom 1877–83; John M. Hamilton 1883–5; Richard J. Oglesby 1885–9; Joseph W. Fifer 1889–93.

Counties, Cities, and Towns.—I. is divided into 102 counties. In 1880 Chicago had pop. 503,185; Peoria 29,259; Quincy 27,268; Springfield 19,743; Bloomington 17,180; Rockford 13,129; Aurora 11,873; Rock Island 11,659; Joliet 11,657; Galesburg 11,437; Jacksonville 10,927; Belleville 10,683; Decatur 9,547; Cairo 9,011; Alton 8,975; Elgin 8,787; Freeport 8,516; La Salle 7,847; Ottawa 7,834; Moline 7,800; and Danville 7,733. In 1889 Chicago reported 850,000, and Peoria 45,000.

Politics.—State, congressional and presidential elections are held on Tuesday after the first Monday in Nov. The state govt. (1889) is republican with a party majority of 19 in the senate, 7 in the house, 26 on joint ballot. Convicts are excluded from voting. I. has 22 electoral votes. Her votes for pres. and vice pres. have been as follows: 1820, James Monroe and Daniel D. Tompkins 3; 1824, Andrew Jackson 2, John Adams 1 for pres., John C. Calhoun 3 for vice-pres.; 1828, Andrew Jackson and John C. Calhoun; 1832, Andrew Jackson and Martin Van Buren 5; 1836, Martin Van Buren and Richard M. Johnson; 1840, Martin Van Buren and Richard M. Johnson; 1844, James K. Polk and George M. Dallas 9; 1848, Lewis Cass and William O. Butler; 1852, Franklin Pierce and William R.

King 11; 1856, James Buchanan and John C. Breckinridge; 1860, Abraham Lincoln and Hannibal Hamlin; 1864, Abraham Lincoln and Andrew Johnson 16; 1868, U. S. Gran and Schuyler Colfax; 1872, U. S. Grant and Henry Wilson 21; 1876, Rutherford B. Hayes and William A. Wheeler; 1880, James A. Garfield and Chester A. Arthur; 1884, James G. Blaine and John A. Logan 22; and 1888, Benjamin Harrison and Levi P. Morton.

Population.—(1810) white 11,501, free colored 613, slaves, 168, total 12,282; (1820) white 58,788, free colored 457, slaves 917, total 55,211; (1830) white 155,061, free colored 1,637, slaves 747, total 157,445; (1840) white 472,254, free colored 3,598, slaves 331, total 476,183; (1850) white 846,034, free colored 5.436, total 851,470; (1860) white 1,704,291, free colored 7,628, total 1,711,951; (1870) white 2,511,096, free colored 28,762, total 2,539,891; (1880) white 3,031,151, free colored, Japanese, Chinese, and Indians 46,720, total 3,077,871; (1889, reported by sec. of state) 3,750,000.

ILLINOIS' RIVER: principal stream in Ill. and with the Ill. and Mich. canal (q.v.) providing an all-water route from Lake Mich. to the Miss. river. It is formed by the union of Des Plaines and Kankakee rivers in Grundy co., almost bisects the state, flows s.w. through Peoria Lake, and after a total course of nearly 500 m. empties into the Miss. river about 20 m. above Alton. It is fed chiefly by the Fox and Sangamon rivers, traverses the richest agricultural and bituminous coal regions of the state, and has a number of flourishing cities and towns on its banks, notably Peoria, Ottawa, La Salle, and Pekin. It is navigable by steamboats 250 miles.

ILLINOIS', UNIVERSITY OF: at Urbana, Champaign co., Ill.; known previous to 1885, July 1, as the Ill. Industrial University. It was established under the act of congress, 1862, granting public land to the states for educational purposes under special conditions (see CORNELL UNIVERSITY). Its apportionment of land was 480,000 acres, all of which, excepting 25,000 acres in Neb. and Minn., were sold and the proceeds put into bonds. Champaigne co. gave grounds, buildings and farms valued at $450,000, and the state has since appropriated to it nearly as much more. Investments and gifts represent assets of about $1,000,000, which yield an income of about $25,000 per annum. The university was opened 1868, and its organization has expanded till it now comprises a college of agriculture and horticulture, with a farm of 410 acres, horticultural and experimental farms of 200 acres, large nurseries, herds of cattle, sheep, and swine, and the necessary buildings and implements; college of civil, mechanical, and mining engineering and architecture; college of natural sciences, chemistry, and natural history; college of literature and art; school of military science; and school of industrial art. In 1871 women were admitted, and 1878 under a state law the university began conferring degrees. The governing board consists of the governor of the state, pres. of the state board of agriculture, supt. of public instruction, and

9 trustees elected by popular vote. In 1886–7 it had a faculty of 30; preparatory dept. students 91; undergraduates 252; bound vols. in library (fire-proof wing of the main building) 17,000; total income $59,321; graduates 512; geological, zoological, and other scientific cabinets; fine-art gallery; and museum of industrial art. Selim H. Peabody, PH.D., LL.D. has been regent since 1880.

ILLINOIS' AND MICHIGAN CANAL: artificial water route between Lake Michigan at Chicago and the Ill. river at La Salle; length 96 m.; begun 1836, July 4, opened for spring navigation 1848; cost $6,409,509. A connection between the two waters was first suggested 1814, and the project received the approval of a special committee of congress, who reported that it would be the greatest work of the age. As first planned, it contemplated a direct cut from Lake Mich. to the Des Plaines river, the e. branch of the Ill. river. A tract of land bordering on the lake and including the site of Chicago was bought from the Indians 1816, and 1822 congress granted the right of way through the public lands, and a strip of land 90 ft. in width on both sides the projected line. Estimates ranging from $639,000 to $716,000, and several surveys for routes were made; congress voted the state in aid of the work (1827) all the alternate sections of land within 5 m. of the line, an aggregate of 286,000 acres, and subsequently added 32,895 acres, making 318,895 in all; a board of commissioners with authority to sell the congressional land-grant and construct the canal was appointed 1829: govt. engineers made further surveys 1830; the state submitted new surveys and estimates—$4,043,000 for a completed canal 49 ft. wide and 4 ft. deep, 1833; and work was begun on plans that called for a cut 60 ft. wide at surface, 36 ft. at bottom, and 6 ft. deep, to cost complete $8,654,000, 1836. Financial questions caused an interruption 1841–45, but after unusual authority had been delegated to three trustees, the work was hastened to completion. In 1871 the canal became the property of the state under its terms of contract with the trustees, who had paid all the bonds and the special loan of $1,600,000, principal and interest; and it has since been managed by a board of three commissioners appointed by the governor. The canal has five navigable feeders aggregating 25 m. in length, each 40 ft. wide and 4 ft. deep; 4 aqueducts; 7 dams; large basins at Lockport, Joliet, Du Page, Ottawa, and La Salle; and locks and dams at Henry and Copperas Creek, those at the latter being partially built by the U. S. govt., which has since been at work on similar improvements at La Grange and Kampsville Landing, to secure uninterrupted navigation to the Miss. river throughout the year.

ILLINOIS' INDIANS: formerly a powerful group occupying what is now Ill., beside large tracts w. of the Miss. river. They comprised the Cahokia, Peoria, Kaskaskia, Tamaroa, and Moingwena tribes; were on friendly terms with the early French missionaries and settlers, and frequently fought the Sac, Fox, and other non-Algonkin tribes.

Their few descendants living are mostly in Indian Territory.

ILLITERATE, a. *ĭl-lĭt′ėr-āt* [L. *illitĕrātŭs*, uneducated —from *il*, not; *litĕræ*, learning—from *litĕră*, a letter]: ignorant; uninstructed. ILLIT′ERATELY, ad. *-lĭ*. ILLIT′ERATENESS, n. and ILLIT′ERACY, n. *-ās-ĭ*, want of learning or reading; ignorance.—SYN. of 'illiterate': untaught; unlearned; unlettered.

ILLNESS: see under ILL.

ILLOGICAL, a. *ĭl-lŏj′ĭ-kăl* [L. *il*, not, and *logical*]: contrary to the rules of logic or sound reasoning; ignorant of the rules of sound reasoning. ILLOG′ICALLY, ad. *-lĭ*. ILLOG′ICALNESS, n.

ILLUDE, v. *ĭl-lôd′* [L. *illūdĕrĕ*, to play on, to sport with—from *il*, in or on; *lūdō*, I play]: to deceive; to mock; to play upon by artifice. ILLU′DING, imp. ILLU′DED, pp.

ILLUME, v. *ĭl-lôm′* [L. *il*, not; *lūmen*, light (see ILLUMINATE)]: to enlighten; to brighten; to adorn; to illuminate. ILLUM′ING, imp. ILLUMED, pp. *ĭl-lômd′*.

ILLUMINATE, v. *ĭl-lô′mĭ-nāt* [L. *illūmĭnātus*, lighted up—from *il*, in or on; *lūmĕn*, light: It. *illuminare*: F. *illuminer*]: to throw light on; to adorn, as books, margins, etc.; to enlighten; to illustrate; to light up with lamps on any festive occasion: N. one of the illuminati. ILLU′MINATING, imp. illustrating; adorning: N. the act of adorning manuscripts and books with ornamented letters and pictorial illustrations. ILLU′MINATED, pp.: ADJ. having ornamented letters and pictorial illustrations: see MANUSCRIPTS. ILLU′MINA′TION, n. *-nā′shŭn* [F.—L.]: the act of supplying with light; that which gives light; the act of adorning, as with ornamented letters and pictures; a display of lights; inspiration. ILLU′MINATIVE, a. *-nā-tĭv*, able to give light. ILLU′MINA′TI, n. plu. *-ĭ-nā′tī*, the enlightened; a name assumed by various sects at different times and places, and who pretended to special spiritual or intellectual enlightenment; specially a secret society of Germany, 1776 (see below). ILLU′MINATOR, n. *-nā-tėr*, one who gives light; one who adorns. ILLU′MINATORS, n. plu. *-tėrz*, the artists who executed the drawings in colors and gold in anc. manuscripts. ILLUMINE, v. *ĭl-lô′mĭn*, to supply with light; to enlighten; to adorn. ILLU′MINING, imp. ILLU′MINED, pp. *-mĭnd*.

ILLUMINATI, *ĭl-lūm-ĭn-ā′tī* (*the Enlightened*): name borne by four different societies—that of the *Alombrados* in Spain, in the end of the 16th c.; that of the *Guerinets* in France, about 1684, enthusiasts and visionaries; an association of Mystics in Belgium, in the latter half of the 18th c.; and the *Order of the Illuminati*, founded at Ingolstadt 1776, May 1, which soon spread over almost all the Rom. Cath. parts of Germany. It is this *Order of the I.* which is now commonly denoted by the term. Its founder at first called it the Order of the Perfectibilists. It owed its existence to Adam Weishaupt, prof. of canon law at

Ingolstadt, a man of superior abilities and much benevolence, but deficient in practical knowledge of mankind. Filled with detestation of Jesuitism, and impatient of the restraints at that time imposed on the human mind in Rom. Cath. Germany, and in no part of it more than in Bavaria, under the bigoted administration of Elector Charles Theodore, he conceived the idea of forming an association which should extend its ramifications everywhere, and should consist of the choicest spirits, should labor for the establishment of the dominion of reason, and promote religious and political enlightenment and emancipation. Religious dogmas and forms of worship were to be rejected, a system of deism was to be propagated, and republican opinions. The accession of the Baron von Knigge to the new order, and the support which it received from the Freemasons, led to its rapid extension, so that, at one time, more than 2,000 of the most accomplished men in Germany were members of it. Weishaupt's knowledge of the order of the Jesuits led him to borrow some of their methods for the accomplishment of what he regarded as the most opposite ends; and the I. were soon involved in a system of mutual espionage, confession, and the like, essentially inconsistent with true freedom, but calculated to place the threads all in one hand, by which the holy legion was to be led on, as it was imagined, to the blessing of mankind. But from this cause the dissolution of the order soon ensued. Weishaupt and Knigge, its two leaders, quarrelled. The order began to be openly denounced as dangerous, and, 1784, June 22, an edict was issued by the Elector of Bavaria for its suppression, which was followed by another 1785, Mar. 2. Weishaupt was degraded and banished. He retired to Halle, where he died 1830, at the age of 83. Various other members were severely punished, and the form of justice was not strictly observed in the proceedings against them.—Great importance was at one time attached to the order of the I., whose secret influence was regarded as a principal cause of many of the political events of the time of the French Revolution, and the works of Abbé Barruel and of Prof. Robison of Edinburgh on this subject were eagerly read; but the highly exaggerated character of the views of these writers is now generally acknowledged.

ILLUPIE: see BASSIA.

ILLUSION, n. *lĭ-lô′zhŭn* [F. *illusion*—from L. *illūsĭōnem*, a mocking—from *il*, in or on; *lūdō*, I sport or play]: deceptive appearance; false show; error. ILLU′SIVE, a. *-sĭv*, deceiving by false show; false; deceptive. ILLU′SIVELY, ad. *-lĭ*. ILLU′SIVENESS, n. ILLU′SORY, a. *-sėr-ĭ*, tending to deceive by false appearance. ILLUSORY APPOINTMENT, legal phrase denoting a very small proportion given to one among several heirs or recipients of property; e.g., where a person has a power or faculty to divide property among several others, such as children, and he gives one or more a very small sum, and the bulk of the property to the rest. In vulgar parlance, it is like cutting off an heir or child with a shilling. In general, it is competent to make an I. A., but much depends on the peculiar terms of the deed or will.—SYN. of 'illusion': deception; deceit; delusion; mockery; chimera; fallacy; hallucination.

ILLUSTRATE, v. *ĭl-lŭs′trāt* [L. *illustrātŭs*, lighted up, illumined—from *il*, in or on; *lustro*, I make bright or clear]: to make clear, bright, or luminous; to explain; to make intelligible; to make more intelligible by adorning with pictures, etc, as a book. ILLUS′TRATING, imp. ILLUS′TRATED, pp.: ADJ. explained more fully by means of pictures, etc. IL′LUSTRA′TOR, n. *-tėr*, one who. IL′LUSTRA′TION, n. *-trā′shŭn*, explanation of what is obscure or but imperfectly understood, particularly by a picture or diagram; explanation enforced by anecdote, etc., as in a speech or sermon. ILLUS′TRATIVE, a. *-tră-tĭv*, serving to illustrate; having the quality of making clear. ILLUS′TRATIVELY, ad. *-lĭ*. ILLUS′TRIOUS, a. *-trĭ-ŭs* [F. *illustre*—from L. *illus′tris*, clear, bright]: eminent by excellence; renowned. ILLUS′TRIOUSLY, ad. *-lĭ*. ILLUS′TRIOUSNESS, n. —SYN. of 'illustrate': to elucidate; exemplify; ornament; adorn;—of 'illustrious': eminent; distinguished; prominent; famous; remarkable; conspicuous; noted; celebrated; signal; noble; exalted; glorious; splendid; luminous; brilliant.

ILLUS′TRATED PUBLICA′TIONS: remarkable feature of the literature of our times. The use of illustrations or pictorial sketches to render books more intelligible and attractive, has long been common, but has of late years been carried to an extent previously unknown. There are various methods of illustration: one is by copper or steel-plate engravings, which, being on leaves apart from the text, are executed separately; another, by wood-engravings, which, inserted as blocks in the typography, are printed as part of the work. Wood-engraving is not new, but it was little employed for general illustration until comparatively recent times. Throughout the 18th and the first quarter of the 19th c., illustrations consisted mostly of separate engravings on copper: see ENGRAVING. In the early part of the 19th c., books of travels and works of a fanciful kind, also in natural history, issued in London, were illustrated chiefly by aquatint engravings. Among artists noted for this species of illustration were Rowlandson, John Clark, and the Cruikshanks, and as the engravings were colored by hand, they were particularly attractive. Clark was principally employed to illustrate voyages and travels. In the preparation of the designs, the author of the work was usually much indebted to the artist, who, in many cases, was furnished with only a few scratches to guide him in his representations. The use of aquatint engravings was at length superseded by lithography; but before this new species of illustration came greatly into vogue, wood-engraving took the place of all kinds of illustrations except that of the high-class line steel-engravings, which were still in use for costly publications. The taste for illustrated works sprang up in England, and thence extended to France, Germany, and the United States. From 1820 to about 1830 was the great era of Illustrated Annuals (q.v.). The taste for these illustrated year-books ultimately wore itself out, and was succeeded by a demand for highly illustrated books of poetry by popular authors, and in the disposal of these elegant works some publishers realized handsome fortunes. Latterly, illustration has consisted for the greater part in wood-engravings, for they possess the inestimable advantage of being printed with the letter-press; and in the hands of high-class artists, the design and execution have reached extraordinary perfection. The beauty of American wood-engraving and printing is known from the monthlies, *The Century* and *Harper's;* and the *English Illustrated Magazine* follows their example. *The Illustrated London News* was the first illustrated paper.—See WOOD-ENGRAVING: NEWSPAPER (Illustrated).

ILLYRICUM, *ĭl-lĭr'ĭ-kŭm* (Gr. ILLYRIS, ILLYRIA): Roman name of a country whose limits in ancient times varied considerably; B.C. 4th c. the Illyrians, ancestors of the modern race generally known as Albanians (see ALBANIA), inhabited the whole e. coast of the Adriatic Sea and adjacent islands, with the w. parts of Macedonia as far as Epirus. Philip of Macedon conquered the country as far as the river Drilon (modern Drino), and thence arose the division into *Illyris Græca* and *Illyris Barbara* or *Romana*. The former, now Albania (q.v.), was incorporated with Macedonia. *Illyris Barbara* or *Romana* was divided into Iapydia, Liburnia, and Dalmatia. The Illyrians were addicted to piracy, which soon brought them into collision with the Romans, and led to their subjugation about two centuries before the Christian era. They made numerous efforts to shake off the Roman yoke, but were always defeated, and the country became a most important province of the Roman empire, comprising the territory represented in modern times by Croatia, Dalmatia, Herzegovina, Montenegro, nearly all Bosnia, and a part of Albania. On the division of the Roman empire, I. shared the vicissitudes that followed. A decree of Napoleon, 1809, Oct. 14, gave the name Illyrian Provinces to Carniola, Dalmatia, and other countries from the Adriatic Sea to the Save, then belonging to the French empire. At his fall, these provinces were united as a kingdom to the Austrian empire, and some alterations were made in its boundaries, especially by the restoration to Hungary of what had formerly belonged to it, and the annexation of the whole of Carinthia instead. The kingdom was divided into the two govts. of Laibach and Trieste, Laibach being the capital, which arrangement subsisted till 1849, when there was a subdivision, for administrative purposes, into the duchies of Carinthia (q.v.), Carniola (q.v.), and the coast district, containing the counties of Görz (q.v.), Gradiska, and Istria (q.v.), with the city and territory of Trieste (q.v.).

ILMEN, *ĭl-mĕn'* (formerly *Moysk*): lake in n.w. Russia, govt. of Novgorod, 27 m. long, 20 m. broad, 16 ft. deep.

The lake is stormy, and unfit for navigation; its bottom stony. The rivers Shelon, Lovat, Msta, and several others, flow into the lake, which discharges its waters through the river Volkhof into Lake Ladoga. The lake abounds in fish, chiefly sandres, bream, and smelt, and fishing on its banks occupies a pop. of about 20,000. The lake I. is historically remarkable, because it was on its banks that the Slavonian tribes lived, who, a thousand years ago (862), invited the Variago-Russ to come and rule over them, from which time dates the origin of the Russian nation.

ILMENITE, n. *ĭl'men-īt:* an ore of iron occurring in various formations—so called as found in the *Ilmen* mountains, Siberia; called also *titanic iron*. Ilmenium, n. *ĭl-mē'nĭ-ŭm*, a hypothetical metal, analogous to tantalum—probably identical with niobium, the supposed base of ilmenic acid. Ilmenic acid, a supposed impure niobic acid.

ILMINSTER, *ĭl'mĭn-stėr:* small but ancient market-town of England, county of Somerset, on the right bank of the Isle, 44 m. s.w. of Bath. The Free Grammar and Commercial Schools, with an endowment of nearly £1,000 a year, were founded 1586. Some manufactures of woolens, silks, and lace are carried on. Pop. about 3,000.

IL OBEID, or El Obeid, *lō-bīd':* important trading town of Africa, cap. of Kordofan; lat. 13° 11′ n., long. 29° 35′ e.; at the foot of a long and gradually sloping plain, the drainage from which, after heavy rains, frequently inundates the principal streets. The town consists of a number of villages, originally separate, and inhabited by distinct races, but now joined together, and distinct only enough to form separate quarters. The general appearance of the place is uninviting, gloomy, and dirty. Gum-arabic, ivory, tamarinds, and ostrich feathers, are chief articles of export. Near this, 1883, a force of Egyptians under Hicks Pasha, with an English staff, was exterminated by a large army of natives under the *Mahdi*, a pretended prophet and assumed successor of Mohammed, in insurrection against the Egyptian government. Pop. estimated abt. 30,000.

ILORI, *ĭl-ō-rē*, or Ilorin, *ĭl-ō-rĭn*, or Alourie, *â-lô'rē:* large town of the Yorubasa country, w. Africa; about 60 m. s. of the Niger, 160 m. from the sea-coast. The people are Yorubas, Houssas, and Bornuese, besides numerous foreign traders. Mohammedanism is the faith of the authorities, but the people mostly are pagan. There is extensive trade with the sea-coast, and with further inland districts; and much industry in making leather goods, carved wood, pottery, and cheese. Pop. estimated 60,000 to 70,000.

ILS'LEY, East: small but ancient market-town of Berkshire, England, in a secluded valley amid bleak and dreary downs, about 56 m. w. of London. It is remarkable chiefly for its sheep-markets, which are among the most important in the kingdom; 50,000 sheep have been penned for sale here in one day. The ordinary sheep-fairs are on every alternate Wednesday, from the Wednesday fortnight before Easter till July. The downs in the vicinity of the town are noted training-grounds for race-horses. About a mile distant is the village of W. Ilsley. Pop. 600.

ILVAITE, n. *ĭl'vă-īt* [*Ilva*, the old name of the island of Elba]: a mineral, a silicate of iron and lime; lievrite.

I'M, *īm:* a contraction for *I am*.

IM, *ĭm* [F. *em*—from L. *im*]: a prefix signifying *in*, *into*, *on*, and in adjectives *not* (see IN)]. *Note.*—In some words *im* is a corruption of the OF. *em* by confusion with L. *im:* *em* has often an intensive force.

IMAGE, n. *ĭm'āj* [F. *image*—from L. *imāgō*, or *imāgĭnĕm*, an image or likeness: It. *imagine*]: a representation or figure of any person or thing, as an idol; a likeness; a statue; a description in discourse; a picture formed in the mind; an idea; in *OE.*, show; appearance; V. to represent or form a likeness of; to imagine. **IM'AGING**, imp. **IM'AGED**, pp. *-ājd*. **IMAGERY**, n. *ĭm'āj-rĭ* or *ĭm'ă-jĕr-ĭ*, sensible representations; lively descriptions which suggest visible representations of objects to the mind; figures in a speech or discourse; in *OE.*, show; appearance; form.

IM'AGE-WOR'SHIP [Gr. *iconolatria*]: use, in public or private worship, of graven or painted representations of sacred persons or things, and especially the exhibition of honor, reverence, or worship to or toward such representations. This practice, in the various degrees of which it is susceptible, has formed, for many centuries, so fruitful a subject of controversy among Christians, that it is expedient first briefly to detail the history of the use of images in Christian worship during the several periods; secondly to state summarily the opposite views of this history which are taken by the two great parties into which Christians are divided on this question.

Neither in the New Testament, nor in any genuine writings of the first age of Christianity, can any trace be discovered of the use of statues or pictures in the public or private worship of Christians. The earliest allsion to such representations is found in Tertullian, who appeals to the image of the Good Shepherd as engraved on the chalices. A very curious pagan caricature of Christianity, of the very same age, lately discovered scratched upon the wall of a room in the palace of the Cæsars (see GRAFFITI), which rudely represents a man standing in the attitude of prayer, with outstretched hand, before a grotesque caricature of the crucifixion, and which bears the title 'Alexamenus worships God,' has been recently alleged by Rom. Catholics as an additional indication of at least a certain use of images among the Christians of the 2d c. The tombs of the Christians in the Roman catacombs, many of which are of a date anterior to Constantine, frequently have graven upon them representations of the Dove, of the Cross, of the symbolical Fish, of the Ship, of Adam and Eve, of Moses striking the rock, of Jonas, of Daniel in the lions' den, of the apostles Peter and Paul, and above all, of the Good Shepherd; and those compartments of the catacombs which were used as chapels are often profusely decorated with sacred representations, the age of which, however, it is not easy to determine with accuracy. But whatever opinion may be formed as to particular instances, such as these, it is admitted by Rom. Catholics themselves (who explain it by the fear of perpetuating the idolatrous notions of the early converts from paganism) that for the first three centuries the use of images was rare and exceptional; nor was it until after the establishment of Christianity under Constantine, and particularly after the condemnation of the Nestorian heresy 430, that statues and pictures of the Lord Jesus, of the Virgin Mary, and the Saints, were commonly introduced in churches, especially in the East and Italy. And yet, even in the 5th c., the practice had already reached a great height, as we learn from the church historian, Theodoret, for the East, and from Paulinus of Nola, for Italy; and in the 6th and 7th c. many popular practices prevailed, which called forth the condemnation of learned and pious bishops both in the East and in the West. It was usual not only to keep lights and burn incense before the images, to kiss them reverently, and to kneel down and pray before them, but some went so far as to make the images serve as godfathers and godmothers in baptism, and even to mingle the dust or the coloring matter scraped from the images with the Eucharistic elements in the Holy Communion! This use of images by Christians was alleged as an obstacle to the conversion of the Jews, and as one of the causes of the progress of Mohammedism in the East; and the excesses described above provoked the reaction of Iconoclasm. See ICONOCLAST: IDOLATRY. In the second Council of Nice, 787, the doctrine as to the worship of images was carefully laid down. A distinction was drawn between the supreme worship of adoration, called *latreia*, and the inferior worship of honor or reverence, called *douleia*; and still more between *absolute* worship, directly and ultimately rendered to a person or thing *in itself*, and *relative*, which is addressed only *through* a person or thing, ultimately *to* another person or thing represented thereby. The second Council of Nice declared, first, that the worship to be paid to images is not the supreme worship of *latreia*, but only the inferior worship of *douleia;* and, secondly, that it is not *absolute*, and does not rest upon the images themselves, but *relative*, that is, only addressed through them, or by occasion of them, to the original which they represent. This explanation of the doctrine and the practice was thenceforth generally received; but a strange error in the translation of the Greek acts of the Council of Nice, by which it appeared that the same adoration was decreed by that council to images 'which is rendered to the Holy Trinity itself,' led to a vehement agitation in France and Germany under Charlemagne, and to a condemnation by a synod at Frankfurt of the doctrines of the Council of Nice. But an explanatiou of this error, and of the false translation on which it was based, was immediately afterward given by the pope; and eventually the Nicene exposition of the doctrine was universally accepted in the Western as well as the Eastern Church.

At the Reformation the reforming party generally rejected the use of images as an unscriptural novelty, irreconcilable as well with the prohibition of the old law as with that characteristic of 'spirit and truth' which is laid down by our Lord as specially distinctive of the new dispensation; and they commonly stigmatized the Rom. Cath. practice as superstitious, and even idolatrous. The Zwinglian, and subsequently the Calvinistic churches, absolutely and entirely repudiated all use of images for the purposes of worship. Luther, on the contrary, while he condemned the Roman worship of images, regarded the simple use of them in the church, even though only for instruction, and as incentives to faith and to devotion, as one of those *adiaphora*, or *indifferent* things, which may be permitted, though not of necessary institution; hence, in the Lutheran churches of Germany and the northern kingdoms, pictures, crucifixes, and other religious emblems are still freely retained. In the Anglican Church, the practice is still a subject of controversy. In the Presb. Church, the Congl. churches, and in all the other Prot. communions, images are entirely unknown.

The Rom. Cath. Church, through the decree of the Council of Trent, disclaims the imputation, commonly made against Rom. Catholics, of the idolatrous worship of images, 'as though a divinity dwelt in them, or as though we asked anything of them, or trusted in them, as the heathens did in their idols.' It renews the Nicene distinction between *absolute* and *relative* worship; the latter of which alone—'whereby we worship Christ and the saints, who are the prototypes of these images'—it sanctions or permits; and it contends for the great advantage, especially for the rude and unlearned people, to be drawn from the use of pictures and statues in the churches as 'memorials of the sufferings and of the mercy of our Lord, as instructive records of the virtues of the saints, and exhortations to the imitation of their example, and as incentives to the love of God and to the practice of piety' (Sess. XXV. *On the Invocation of Saints*). In many foreign churches, especially in Italy, in s. Germany, and in France, are images popularly reputed as especially sacred, to which, or to prayers offered before which, miraculous effects are ascribed. But instructed Rom. Catholics declare that the legends connected with such images form no part of the belief of their church. Most Rom. Cath. books of instruction contain cautions against attributing such effects to any special virtue of the images themselves, rather than to the special faith, trustfulness, and fervor which are stirred up by their presence, and by the recorded examples of the mercy of God with which they are associated in the minds of the faithful.

IMAG'INARY QUAN'TITY, or **IMPOSSIBLE QUANTITY**, in Algebra: a root of an even negative quantity, which can be extracted only *formally*. In the working of many algebraic problems, it often happens that the root of a negative quantity must be extracted; if the root is odd, the operation can be performed (see INVOLUTION); but if even, the root can only be *formally* extracted, and is in consequence called an *impossible* or *imaginary* quantity. For instance, the cube root of -64 is not an imaginary quantity, for $-4 \times -4 \times -4 = -64$, and therefore $\sqrt[3]{-64} = -4$; but the square root of -64 is an impossible quantity, for no possible quantity (whether it be $+$ or $-$) multiplied by itself can produce a negative quantity; similarly and *a fortiori*, the fourth root of -64 is an impossible quantity, and the same is true of all even roots. Imaginary quantities are, however, generally reduced to one denomination as multiples of $\sqrt{-1}$, in the following manner: $\sqrt{-64} = \sqrt{64 \times -1} = \sqrt{64} \times \sqrt{-1} = 8\sqrt{-1}$; and again, $\sqrt{18a^5} = \sqrt{9a^4 \times -2a} = \sqrt{9a^4} \times \sqrt{2a} \times \sqrt{-1} = 3a^2\sqrt{2a}\sqrt{-1}$. These forms very frequently occur in higher algebra.

IMAGINA'TION: a word whose meaning enters into many relationships, and is thereby rendered difficult to define. The principal meaning is doubtless what connects it with Poetry and Fine Art, from which the other significations branch off. The simplest mode of explaining this complicated relationship will be to state in separation the different constituents of the power in question. We shall then see why and where it touches on other faculties, which still require to be distinguished from it.

1. I. has for its objects the *concrete*, the real, or the individual; as opposed to abstraction and generalities, which are the material of science. The full coloring of reality is implied in our imagination of any scene of nature. In this respect, there is something common to I. and memory. If we endeavor to imagine a volcano, according as we succeed, we have before the mind everything that a spectator would observe on the spot. Thus, sensation, memory, and I. alike deal with the fulness of the actual world, as opposed to the abstractions of science and of the reasoning faculties.

The faculty called *conception*, in one of its meanings, has also to do with this concrete fulness, though, in what Sir William Hamilton deems the original and proper meaning of the word conception, this power is excluded. In popular language, and in the philosophy of Dugald Stewart, conception is applied to the case of our making real to our thought any description of actual life as given in history or in poetry. When we completely enter into a scene portrayed by a writer or speaker, and approach the situation of the actual observer, we are often said to *conceive* what is meant, and also to imagine it; a common (though not strictly correct) word for this signification is 'realize.'

2. It is further essential to I. in its strictest sense that there should be some original construction, or that what is imagined should not be a mere picture of what we have seen. Creativeness, origination, invention, are names also designating the same power, and excluding mere memory, or the literal reproduction of past experience. Every artist is said to have I. according as he can rise to new combinations or effects different from what he has found in his actual observation of nature. A literal, matter-of-fact historian would be said to be wanting in the faculty. The exact copying of nature may be very meritorious in an artist, and very agreeable as an effect, but we should not designate it by the term imagination. There are, however, in the sciences, and in all the common arts, strokes of invention and new constructions, to which it seems unfair to refuse the term in question, if originality be a leading feature in its definition. It is not necessary to deny that the term I. may be shaded to include these strokes; yet it is not usually applied in such cases, unless the inventive stroke is thought of as impelled by a strong emotion, conviction, purpose, or sentiment of the soul.

3. This leads to the remark that I. has for its ruling element some *emotion*—it may be of moral conviction, purpose, desire, hope, fear, or other strong sentiment of the

soul, to gratify which all its constructions are guided. Whenever we are under the mastery of some strong emotion or sentiment, the current of our thoughts is affected and colored by it; what chimes in with it is retained, and other things recede from sight. We also form new constructions that suit the state of the moment. Thus, in fear, we are overwhelmed by objects of alarm, and even conjure up spectres that have no existence. One of the most evident and impressive—though not necessarily the highest—instance of I. is seen in the constructions of fine art, which are determined by those emotions called *æsthetic*, the sense of beauty, the pleasures of taste; these are sometimes expressly styled 'pleasures of the imagination.' The artist has in himself those various sensibilities to an unusual degree, and he carves and shapes his creations with the view of gratifying them to the utmost. Thus it happens that in the common thought fine art and imagination are related together. Yet it may be said that science and the useful arts also have important relation to I. or the image-making faculty of the mind, in cases when that faculty is considered as working according to the law and order of the universe. Indeed. I. has been the eager leader of science, the fervent and sanguine precursor and explorer in unknown realms, whose elements and materials it has constructed into a highway which science thereafter could make firm for a passage-way of the common thought.

The term 'Fancy' was originally identical with imagination. It is a corruption of fantasy, from the Greek *fantasia*. It has now a shade of meaning somewhat different, being applied to those creations that are most widely removed from the world of reality or of the possible. In the exercise of our I., we may keep close to nature, and indulge the liberty only of re-combining what we find, so as to surpass the original in some points, without forcing together what could not co-exist in reality. This is the sober style of art. But when, in order to gratify the unbounded longings of the mind, we construct a fairyland with characteristics altogether beyond what the law and order of the universe can furnish, we are said to enter the regions of fancy and the fantastical. Thus fancy may be a sportive, or a wild, or a dreamy, or a grotesque, absurd, extravagant, unnatural exercise of the imaginative faculty. Imagination may be daring, far-flying, adventurous; but it always holds some traceable connection with reason, fact, and truth. Indeed in one point of view, this great constructive and interpretative faculty may be called the noblest of the faculties in man.

The 'ideal,' and 'ideality,' also are among the synonyms of imagination. The 'ideal' is something conceived that fascinates the mind, by its delicacy, sublimity, fitness, or beauty--thus gratifying some of our strong emotions and cravings, when reality is insufficient for that end. Desiring something to admire and love beyond what the world can supply, we strike out a combination free from the defects of common humanity, and adorned with excellence more than human only because it is beyond what humanity has yet reached, though not beyond an imagined *possible:* this is our 'ideal;' it satisfies our emotions, and the fact of its so doing is the determining influence in the construction of it.

IMAGINE, v. *ĭm-ăj'ĭn* [F. *imaginer*, to imagine—from L. *imagĭnārī*, to picture to one's self—from *imāgō*, an image]: to form the notion or idea of a visible object in the mind; to fancy; to scheme; to contrive. IMAG'INING, imp. forming in the mind; devising: N. the act of forming in the mind; fancy; thing imagined. IMAG'INED, pp. *-ĭnd:* ADJ. formed in the mind; contrived. IMAG'INABLE, a. *-ĭn-ă-bl* [F.—L.]: that may or can be imagined. IMAG'INABLY, ad. *-ă-blĭ*. IMAG'INARY, a. *-ĕr-ĭ*, existing only in the imagination; visionary; unreal; fancied. IMAG'INA'TION, n. *-ā'shŭn* [F.—L]: scheme or contrivance formed in the mind; that power or faculty of the mind by which it conceives or forms ideas of things, whether existing but not present to the senses, or not existing (see below); in *OE.*, contrivance; scheme. IMAG'INATIVE, a. *-ă-tĭv*, full of imagination. IMAG'INATIVENESS, n. IMAGINARY-FOCUS, in *optics*, the point toward which converging rays tend, but which they are prevented from reaching by some obstacle.—SYN. of 'imaginary': ideal; fanciful, chimerical;—of 'imagination': idea; fancy; device; conception; conceit; thought;—of 'imagine': to suppose; conceive: apprehend; presume; assume; think; believe; deem; plan; frame; devise; opine.

IMAGO, n. *ĭ-mā'gō* [L. *imāgō*, an image or likeness]: the third or perfect state of insects—the *larva* and *pupa* being the preceding states.

IMAM, n. *ĭ-mâm'*, or IMAN, n. *ĭ-mân'*, also IMAUM, n. *i-mawm'* [Ar. *imam*]: a Mohammedan bishop; a prince having supreme spiritual as well as temporal power. I. is commonly applied to any of the persons belonging to the Mohammedan Ulema (q.v.), or priestly body. They are distinguished from the laity by a turban somewhat higher than usual, and are held in great reverence by the people. The sultan himself has the title of I. as the spiritual chief of all Moslems. The word is sometimes incorrectly written.

IMA'US: see HINDÚ-KÚSH.

IMBALM, IMBANK, IMBARGO, IMBARK, IMBAY: see EMBALM, ETC.

IMBAT'TLED: see EMBATTLED.

IMBECILE, n. *ĭm'bĕ-sĭl* or *-sēl* [OF. *imbecille;* F. *imbécile* —from L. *imbēcil'lŭs*, feeble]: one who is destitute of strength either of body or mind: ADJ. weak; infirm; destitute of strength of either body or mind. IM'BECIL'ITY, n. *-sĭl'ĭ-tĭ*, weakness; feebleness of body or mind; defective state of mind not amounting to idiocy. *Note.*—The OE. verb *embec'ill*, to weaken, to enfeeble, subsequently obtained the sense, 'to diminish, to subtract from,' and hence the connection of the OE. word *embecill* with the mod. Eng. *embezzle*, to purloin—see Skeat.—SYN. of 'imbecile, a.';

feeble; impotent; debilitated; decrepit;—of 'imbecility': infirmity; debility; feebleness; impotence.

IMBECIL'ITY: weakness through imperfect development of mind; not to be confounded with idiocy, which is *non*-development of mind. In the feeble intellect, there may be present every faculty which distinguishes the most gigantic understanding, and these may act under ordinary laws; but they are dwarfed, incapable of continued growth and training, and are exercised and applied under the guidance and assistance of others, or of external circumstances. There are large numbers of weak-minded, useless persons in every community, who differ from the more robust intellects solely in degree. But the more marked and recognizable imbecility—as transmitted congenitally, as following dentition, chorea, convulsions, and diseases which retard vigorous bodily development, or as induced by the great constitutional changes at puberty—is characterized by all or many of the following symptoms. The expression is vacant, the senses are dull; the head is small, the body deformed; the gait is vacillating and restless; the head is pendent, thrown back, or agitated; the saliva escapes; the language is limited and infantile; the ideas are few, and consist of mere sensuous impressions; the temper is timid, facile, and vain; and the passions are little susceptible of control. The affection has been regarded as general, or involving the whole mind; or as partial, when the intellect only, or the sentiments only, or a particular faculty may be feeble and ineducable. In a legal view, such persons have been divided into those who have, and those who have not, a moral perception of right and wrong. It is, however, worthy of consideration, that while they may know right from wrong in their ordinary and habitual range of duties, and within the scope of their own capacity, they may fail to do so beyond these narrow limits, and where questions of property, propriety, or abstract justice are concerned. Many imbeciles are muscular, capable of performing acts requiring strength and endurance rather than dexterity; and often they are not merely the 'naturals,' who run everybody's messages, but they are converted into the domestic drudges of the homestead and the farm. From the more clever and cunning of the class were the professional fools of former ages selected. Imbeciles are often confounded with genuine idiots, and their partial educability has exaggerated the supposed success in the attempts to elicit and mature the embryo mind.

IMBECILITY, in law—i.e., something short of idiocy or lunacy—is in most countries no ground of relief against a contract, though relief is always granted in case of fraud, and the I. of one of the parties may form an element of the fraud. Nor does law usually in any peculiar way protect an imbecile person or his property; for so long as a person is not actually insane or an idiot, he can do what he likes with his own. In Scotland, however, an imbecile person is to a certain extent protected against being imposed upon, as regards his heritable property, by a step called interdiction, which consists in either the imbecile, who is conscious of his weakness, executing a bond of interdiction, by which he puts himself under trustees, whose consent is in future made necessary to render valid his contracts, or he may be judicially interdicted by the court of session, at the instance of his next of kin, with like effects.—See Lunacy.

IMBED: see Embed.

IM′BER, or Im′mer: see Diver.

IMBERBIS, a. *ĭm-bėr′bĭs* [L. *imberbis*, without a beard—from *im*, not; *barba*, a beard]: in *bot.*, smooth; without a beard.

IMBIBE, v. *ĭm-bīb′* [F. *imbiber*, to imbibe—from L. *imbĭbĕrĕ*, to drink in—from *im*, into; *bĭbo*, I drink]: to drink or suck in; to absorb; to receive or admit into the mind. Imbi′bing, imp. Imbibed′, pp. *-bībd′*. Imbi′ber, n. *-bėr*, one who. Imbibition, n. *ĭm′bĭ-bĭsh′ŭn*, the act of sucking or drinking in; the action by which the passage of a fluid, or of gaseous matters, is effected through dead and living tissues; endosmosis.

IMBITTER, v. *ĭm-bĭt′tėr* [*im*, for *em*, with intensive meaning, and *bitter*]: to make bitter; to render unhappy; to render more distressing; to exasperate. Imbit′tering, imp. Imbit′tered, pp. *-tėrd:* Adj. rendered unhappy or painful; exasperated.

IMBODY, IMBOLDEN, IMBORDER, IMBOSOM, IMBOWER, and **IMBRACE**: see Embody, Embolden, etc.

IMBOW, v. *ĭm-bō′* [*im*, in, and *bow*]: to form like a bow; to arch; to vault. Imbow′ing, imp. Imbowed′, pp. *-bōd′*. Imbow′ment, n. *-mĕnt*, an arch or vault.

IMBRICATE, a. *ĭm′brĭ-kāt*, or Im′bricated [L. *imbrĭcātus*, formed like a gutter-tile—from *imbrex*, a gutter-tile]: bent or hollowed like a roof or gutter-tile; lying over each other like tiles upon a roof; in *bot.*, applied to the parts in a flower-bud which alternately overlap each other and are arranged in a spiral manner. Im′brica′tion, n. *-kā′shŭn*, a concave indenture like that of tiles. Im′bricative, a. *-kā-tĭv*, overlapping at the edge; denoting the condition in which the tops of the pieces composing the verticil touch.

IMBROGLIO, n. *ĭm-brōl′yō* [It.]: intricacy; a complicated plot; a complicated and embarrassing state of things.

IMBROS, *ĭm′brŏs:* island of the Ægean Sea, about 11 m. n.e. of Lemnos, and the same distance from the mouth of the Dardanelles. It is 18 m. in length; 116 sq. m. The island is mountainous, its highest summit being 1,845 ft. above sea-level, and is covered with wood. Corn, wine, and cotton are abundantly grown in the valleys; oil also is produced. I. contains four villages, the chief of which, Imbro, is built on the site of an ancient town of the same name. Pop. of island, about 4,000.

IMBROWN, v. *ĭm-brown'* [*im*, for *em*, with intensive force, and *brown*]: to render brown or dirty; to obscure. **IMBROWN'ING**, imp. **IMBROWNED'**, pp. *-brownd'*.

IMBRUE, v. *ĭm-brô* [OF. *embreuver*, to moisten, to soak in—from OF. *beuvre;* It. *bevere*, to drink]: to steep, soak, or drench, generally applied to blood; to wet or moisten. **IMBRU'ING**, imp. **IMBRUED'**, pp. *-brôd'*. **IMBRUED**, or **EMBRUED**, in *her.*, signifies dropping with blood. **IMBRUE'MENT**, n. the act of imbruing.

IMBRUTE, v. *ĭm-brôt'* [*im*, into, and *brute*]: to degrade to the state of a brute. **IMBRU'TING**, imp. **IMBRU'TED**, pp.

IMBUE, v. *ĭm-bū'* [L. *imbŭĕrĕ*, to cause to drink in, to wet or soak]: to dye; to tinge deeply; to tincture; to cause to imbibe, as the mind. **IMBU'ING**, imp. **IMBUED'**, pp. *-būd'*. **IMBU'MENT**, n. *-mĕnt*, a deep tincture.

IMERITIA, *ē-mĕr-ĭsh'ē-a:* formerly an independent Transcaucasian territory, anciently a part of Colchis, then united to Georgia (q.v.) now part of the govt. of Kutaïs (see TRANSCAUCASIA); bounded n. by the Caucasian Mountains, w. by the districts of Ghuria and Mingrelia: 4,040 sq. m.; pop. 100,000. Its history as an independent dominion commenced about the beginning of the 15th c., and was long marked by internal dissensions. In 1745, Salomon I. was proclaimed, but his nobles revolting shortly after, and aided by the Turks, dethroned him. Salomon applied for help to Russia, and 1769, Count Todtleben, at the head of a Russian force, entered I , restored the king, and drove back the Turks. The civil dissensions of this province, however, continued, and at last, 1810, after having acknowledged allegiance to Russia, it was formally incorporated in and proclaimed a province of that empire.

IM'IDES: see ORGANIC BASES.

IMITATE, v. *ĭm'ĭ-tāt* [L. *imĭtātŭs*, imitated: It. *imitare;* F. *imiter*, to copy]: to follow, or to endeavor to follow, another in manners, style, etc.; to copy generally; to counterfeit. **IM'ITATING**, imp. **IM'ITATED**, pp.: **ADJ.** followed; copied. **IM'ITABLE**, a. *-tă-bl* [F.—L.]: that may be imitated or copied. **IM'ITABIL'ITY**, n. *-bĭl'ĭ-tĭ*, quality of being imitable. **IM'ITATOR**, n. *-tā-tėr*, one who follows a pattern; a copyist. **IM'ITA'TION**, n. *-shŭn* [F.—L.]: that which is made or produced as a copy or likeness; a copy after a form or original: the act of following in manner, etc. (see SYMPATHY): a counterfeit; a copy in inferior materials; a work of art resembling something which we know it is not. **IM'ITATIVE**, a. *-tĭv*, inclined to follow in manner; aiming at resemblance. **IM'ITATIVELY**, ad. *-lĭ*.

IMITA'TION, in the Science of Musical Composition: repeating of the same passage, or the following of a passage with a similar one, in one or more of the other parts or voices: the I. may be either strict or free. When the imitated passage is repeated note for note, and every interval is the same, it is called strict, and it may take place in the unison or octave, or in any other of the degrees of the scale, either above or below the original passage. The progression of a passage may be imitated also by an inversion, or by reversing the movement of the original; also by notes of a greater or of a lesser value. See DOUBLE COUNTERPOINT: FUGUE: CANON. I. in composition is one of the most important means of producing unity and animation in the progression of the parts, and is used in a strict, also in a free manner, in the instrumental works of Haydn and Beethoven, also by Mozart in his easier operatic works. Many composers, however, resort to I. improperly, generally from poverty of musical ideas, or from pedantry. No fixed rules can be given for its use.

IM'ITATIVE INSAN'ITY: mental disease propagated by imitation or through sympathy. There are many mental diseases, especially those marked by grotesque external manifestations, by gesticulations, and convulsive seizures, which appear to be so propagated. In the healthy and naturally constituted, there exists a tendency to copy and reproduce, or represent what powerfully impresses the imagination; and during the excitement of individuals or communities, this inclination is more influential, and may pass beyond the control of the will. See SYMPATHY. Great caution, however, must be exercised in distinguishing between what is epidemic and depends on atmospheric or external moral causes, from the results of strong or morbid states of the mind itself. An idiot is mentioned by Gall, who, having seen the slaughter of a pig, killed a man after the same fashion. A child of seven years old suffocated a younger brother on the suggestion of the strangling of Punch at the hands of the devil. The exexample of suicide by hanging having been set by a pensioner in the Hôpital des Invalides, six similar deaths followed, and by suspension from the same lamp-post. After the return of the Bourbons, there appeared in succession seven female claimants to the parentage of Marie Antoinette; and pyromania, propagated by sympathy, is well known to have existed in Normandy 1830.

IMMACULATE, a. *ĭm-măk'ū-lāt* [L. *immăculātus*, unstained—from *im*, not; *măcŭlă*, a spot: It. *immacolato:* F. *immaculé*]: spotless; pure; unstained. IMMAC'ULATELY, ad. *-lĭ*. IMMAC'ULATENESS, n. IMMACULATE CONCEPTION, the doctrine that the Virgin Mary was born without original sin—held in the R. Cath. Church.

IMMAC'ULATE CONCEPTION OF THE BLESSED VIRGIN MARY, FEAST OF: festival celebrated Dec. 8, in the Latin, and Dec. 9 in the Greek Church, in which latter church it is held under the name of 'The Conception of St. Anne,' mother of the Virgin Mary. The festival of the Conception itself is traceable in the Greek Church from the end of the 5th c., and in the Latin dates from the 7th c.; but a great controversy prevailed long in the West as to whether and in what sense the conception of the Virgin Mary was to be held immaculate, and in what sense the Virgin herself was to be held conceived without sin. It was believed to be a consequence of the doctrine of the divine maternity, and a necessary part of the honor due to the Incarnation, that the Blessed Mother should be held to have been at all times free from the stain of sin. This might have been, either by her having been, like the prophet Jeremiah (Jer. i. 6), or John Baptist (Luke, i. 35), sanctified before her birth—that is, purified in her mother's womb from the stain of original sin; or by the still higher sanctification of having been entirely exempted from the stain of sin, either—for the discussion was carried to all these subtleties—before the formation of the embryo in the womb of her mother, or at least before its animation by union with the soul. The actual controversy in the West may be said to have commenced with St. Bernard, who not only remonstrated with the canons of Lyon, 1131 for their unauthorized introduction of this festival in their cathedral, but rejected the opinion of the Virgin's having been conceived free from original sin, though he admitted her sanctification in her mother's womb (*Epist.* 174, *Ad Canon. Lugdunensis*). The discussion thus raised led to a protracted controversy in the schools. The great master or scholastic subtlety, John Duns Scotus, in a disputation before the Univ. of Paris, 1307, maintained the doctrine of the I. C. in its highest sense; and the entire order to which he belonged, the Franciscan, as well as the school to which he has given his name, the Scotists, afterward zealously defended it. On the other hand, the Thomist school, which was that of the Dominican order, having denied the I. C., much division for a time existed; but the prevailing tendency was at all times toward the Scotist opinion. The Univ. of Paris, 1387, condemned the Thomist doctrine. The Council of Basel—though, it is true, at the time when it was in conflict with the pope—declared the doctrine of the I. C. to be a dogma of the church, and reprobated in the strongest terms the opposite opinion. Sixtus IV., however, imposed on the defenders of both opinions, 1470, the obligation of mutual toleration and charity, and renewed this constitution, 1483; but in the end of the same century the Univ. of Paris required, as a condition of the doctorate, an oath on the part of the candidate that he would defend the dogma of the I. C. The Council of Trent, without discussing the scholastic dispute, merely declared that 'in its decree on original sin it did not comprehend the blessed and immaculate Virgin Mary,' and renewed the constitution of Sixtus IV. above referred to. This abstinence on the part of the council led to further renewal of the dispute, which reached such a pitch toward the close of the 16th c. that Pius V. not only prohibited either side from stigmatizing the opposite with the name of heretical, but forbade all public discussion of the subject, except in theological disputations in the presence of a learned auditory. In the pontificates of Paul V. and Gregory XV., earnest instances were made by the Spanish crown to obtain a definite declaration in favor of the doctrine of the I. C.; but the pope again refused, contenting himself with repeating the constitution of Sixtus IV. He added, however, certain new provisions: 1. That disputants, in asserting the doctrine of the I. C., should abstain from assailing the opposite doctrine. 2. That no one except the members of the Dominican order, and others specially privileged, should presume to defend, even in private disputation, the doctrine that the Blessed Virgin Mary was conceived in original sin. 3. That, nevertheless, in the public mass or office of the church, no one should introduce into the prayers or other formularies any other word than simply *conceptio,* without adding any epithet involving either doctrine. At the same time, opinion was setting steadily in favor of the doctrine of the I. C. Alexander VII., and afterward Clement IX., added new solemnity to the festival. Clement XI. ordained that it should be observed as a holiday of obligation, and at length Gregory XVI. permitted that the epithet immaculate should be introduced into the public service. In the end, at the instance of bishops in various parts of the church, Pope Pius IX., addressed a circular to the bishops of each nation, calling for their opinion, and that of their people, as to the faith of the church on the point; and on the receipt of replies nearly unanimous, he issued a solemn decree at Rome, in a numerous council of bishops, 1854, Dec. 8, declaring the doctrine to be an article of belief, and proposing it as such to the universal church. This decree has been implicitly accepted throughout the Roman Church.

IMMANENT, a. *ĭm'mă-nĕnt* [L. *im*, in; *manens*, or *manen'tem*, remaining or abiding]: inherent; abiding; intrinsic.

IMMANITY, n. *ĭm-măn'ĭ-tĭ* [L. *immānis*, enormous, immense in *OE.*, savageness; barbarity.

IMMANUEL, n. *ĭm-măn'ū-ĕl* [Heb.—made up of *im*, with, *anu*, us, and *ēl*, God]: God with us; a title of Jesus Christ as the son of God, and the Saviour; also **Emman'uel** (q. v.).

IMMARCESSIBLE, a. *ĭm'mâr-sĕs'sĭ-bl* [L. *im*, not; *marces'cĕrĕ*, to wither or pine away]: in *OE.*, unfading.

IMMARGINATE, a. *ĭm-mâr'jĭn-āt* [L. *im*, not; *margĭnātus*, furnished with a border—from *margo*, a border]. in *bot.*, not having a border or margin.

IMMATERIAL, a. *ĭm'mă-tē'rĭ-ăl* [F. *immatériel*—from mid. L. *immatĕrĭālis*, immaterial—from *im*, not; *matĕrĭă*, matter]: not consisting of matter; unsubstantial; spiritual; unimportant. **Im'mate'rialized**, a. *-īzd*, spiritualized. **Im'mate'rialism**, n. *-ĭzm*, the doctrine of the existence or state of spiritual beings; the doctrine which denies the existence of matter. **Im'mate'rialist**, n. *-ĭst*, one who professes the doctrine of. **Im'mate'rially**, ad. *-lĭ*. **Im'mate'rial'ity**, n. *-ăl'ĭ-tĭ* [F. *immatérialité*]: the quality of not consisting of matter; distinctness from body or matter. —Syn. of 'immaterial': insignificant; inconsiderable; trifling; trivial, frivolous; futile; unessential; irrelevant; petty; incorporeal; disembodied.

IMMATURE, a. *ĭm'mă-tūr* [L. *immatūrŭs*, not arrived at full growth—from *im*, not; *matūrus*, ripe]: that has not arrived at a perfect state; unripe; not perfect; too early; also IMMATURED, a. *ĭm'mă-tūrd*. IM'MATURELY, ad. *-lĭ*. IM'MATU'RITY, n. *-tū'rĭ-tĭ*, and IM'MATURE'NESS, n. *-tūr'-nĕs*, unripeness; the state of that which has not arrived at perfection.—SYN. of 'immature': early; premature; imperfect; hasty; incomplete.

IMMEASURABLE, a. *ĭm-mĕzh'ūr-ă-bl* [*im*, not, and *measurable*]: that cannot be measured or fathomed; immense. IMMEAS'URABLENESS, n. *-bl-nĕs*, state of being incapable of measure. IMMEAS'URABLY, ad. *-ă-blĭ*. IMMEAS'URED, a. *-ūrd*, in *OE.*, unmeasured.

IMMEDIACY, n. *ĭm-mē'dĭ-ă-sĭ* [see IMMEDIATE]: in *OE.*, power of acting without dependence or intervention; personal greatness.

IMMEDIATE, a. *ĭm-mē'dĭ-āt* [F. *immédiat*—from mid. L. *immĕdĭātus*, immediate—from L. *im*, not; *mĕdĭŭs*, middle]: without delay; instant; without the intervention of time; not acting by second causes. IMME'DIATELY, ad. *-lĭ*, without the intervention of any other cause or event; instantly. IMME'DIATENESS, n.—SYN. of 'immediately': directly; instantly; quickly; presently; proximately.

IMMEDICABLE, a. *ĭm-mĕd'ĭ-kă-bl* [L. *im*, not; *mĕdĭcābĭlĭs*, that can be healed or cured]: that cannot be healed or cured.

IMMEMORIAL, a. *ĭm'mĕ-mō'rĭ-ăl* [L. *im*, not, and *memorial:* F. *immémorial*, immemorial]: beyond memory; whose beginning cannot be remembered or traced; in *Eng. law*, long ago, arbitrarily fixed at the reign of Richard I.; in *Scot.*, before forty years ago. IM'MEMO'RIALLY, ad. *-lĭ*.

IMMENSE, a. *im-mĕns'* [F. *immense*—from L. *immensus*, boundless, endless—from *im*, not; *mensus*, measured: It. *immenso*]: very large; enormous; boundless. IMMENSE'LY, ad. *-lĭ*. IMMENSE'NESS, n. the state of being immense; unbounded extent; immensity. IMMEN'SITY, n. *-mĕn'sĭ-tĭ* [F. *immensité*]: vastness in extent or bulk; an extent that cannot be measured.—SYN. of 'immense': infinite; immeasurable; illimitable; unbounded; unlimited; interminable; prodigious; vast; monstrous; huge.

IMMENSURABLE, a. *ĭm-mĕn'sūr-ă-bl* [L. *im*, not; *mensūră*, a measure]: not to be measured. IMMEN'SURABIL'ITY, n. *-bĭl'ĭ-tĭ*, not being capable of measurement.

IMMERGE, v. *ĭm-merj'* [F. *immerger*, to immerse—from L. *immer'gĕrĕ*, to plunge or sink into—from *im*, into; *mergo*, I plunge in]: to plunge into or under, as under a liquid; to dip. IMMERG'ING, imp. IMMERGED', pp. *-mėrjd'*.

IMMERMANN, *ĭm'mėr-mân*, KARL LEBERECHT: 1796, Apr. 24—1840, Aug. 25, b. Magdeburg, Germany: dramatist. He was educated in the universities of Halle and Jena, entered the Prussian judiciary service, and while employed in Magdeburg, Münster, and Düsseldorf engaged in dramatic and poetic composition, managed the

Düsseldorf Theatre 1834–38, and afterward resumed judicial life. He had high conceptions of art, pure taste, and great enthusiasm, all far ahead of his time. His chief comedies are *Das Auge der Liebe* (1824) and *Die Schule der Frommen* (1829); tragedies *Alexis* (1832) and *Ghismonda* (1839); romances *Epigonen* (1836) and *Münchausen*, 4 vols. (1838–9). He also wrote fairy tales and several volumes of poetry.

IMMERSE, v. *ĭm-mėrs′* [L. *immersus*, plunged or sunk into (see IMMERGE)]: to plunge into or under, as into a liquid; to overwhelm; to engage deeply, as in business. IMMERS′ING, imp. IMMERSED′, pp. *-mėrst′*: ADJ. in *bot.*, growing entirely under water—applied to the leaves of aquatic plants; having one part or organ completely embedded in another. IMMER′SIBLE, a. *-sĭ-bl*, that may be immersed. IMMER′SION, n. *-mėr′shŭn* [F.—L.]: the act of plunging into a liquid till covered; state of being immersed; baptism by plunging into water; in *astron.*, the approach of one celestial body into such a position with respect to another as apparently to sink into it and disappear; the entrance of the moon into the earth's shadow in an eclipse.

IMMETHODICAL, a. *ĭm′mĕ-thŏd′ĭ-kăl* [*im*, not, and *methodical*]: having no method; without systematic arrangement; confused. IM′METHOD′ICALLY, ad. *-lĭ*.—SYN. of 'immethodical': disorderly; irregular; unsystematic.

IMMIGRATE, v. *ĭm′mĭ-grāt* [L. *immigrātus*, removed into—from *im*, into; *migrō*, I migrate or wander: It. *immigrare*]: to pass or remove into a country for permanent residence—applied to persons in regard to the country in which they settle. IM′MIGRATING, imp. IM′MIGRATED, pp. IM′MIGRANT, n. *-grănt*, a person who comes into a country for permanent residence—spoken of persons in regard to the country in which they settle; opposite of *emigrant*, one who removes out of a country. IM′MIGRA′TION, n. *-grā′shŭn*, removing into a country for permanent residence.

IMMIGRATION, into the United States: inflow of pop. from foreign countries. Under an act of congress, 1819, March 2, the first attempt to keep a record of the number of people arriving at the various ports from foreign countries was made, 1820, by collectors of customs. The arrivals, 1789-1820, were estimated, at 250,000. From 1820 to 1856 all alien passengers were counted together, but since 1856 the totals of immigrants have been kept separate. Prior to 1867 the reports were in general for the calendar years; since then they are for the fiscal years ending June 30. The immigration of Chinese laborers was stopped by law, 1882, May 6, and immigrants from the Dominion of Canada and Mexico have not been included in the official reports since 1885, June 30. These facts should be borne in mind in examining the subjoined tables.

ARRIVAL OF FOREIGN PASSENGERS INTO THE UNITED STATES, 1820-89.

Year.	Passengers.	Year.	Passengers.	Year.	Immigrants	Year.	Immigrants
1789	Est. 250,000	1837	79,340	1856	195,857	1875	227,498
1820		1838	38,914	1857	246,945	1876	169,986
1820	8,385	1839	68,069	1858	119,501	1877	141,857
1821	9,127	1840	84,066	1859	118,616	1878	138,469
1822	6,911	1841	80,289	1860	150,237	1879	177,826
1823	6,354	1842	104,565	1861	89,724	1880	457,257
1824	7,912	1843	52,496	1862	89,007	1881	669,431
1825	10,199	1844	78,615	1863	174,524	1882	788,992
1826	10,837	1845	114,371	1864	193,195	1883	603,322
1827	18,875	1846	154,416	1865	247,453	1884	518,592
1828	27,382	1847	234,968	1866	167,757	1885	395,346
1829	22,520	1848	226,527	1867	298,967	1886	334,203
1830	23,322	1849	297,024	1868	282,189	1887	490,109
1831	22,633	1850	369,980	1869	352,768	1888	546,889
1832	60,482	1851	379,466	1870	387,203	1889	438,614
1833	58,640	1852	371,603	1871	321,350		
1834	65,365	1853	368,645	1872	404,806	Tot.	15,174,269
1835	45,374	1854	427,833	1873	459,803		
1836	76,242	1855	200,877	1874	313,339		

CHINESE IMMIGRATION INTO THE UNITED STATES, 1855-87.

Year.	No.	Year.	No.	Year.	No.	Year.	No.
1855	3,526	1864	2,795	1873	18,154	1882	35,614
1856	4,733	1865	2,942	1874	16,651	1883	381
1857	5,944	1866	2,385	1875	19,033	1884	84
1858	5,128	1867	3,863	1876	16,679	1885	53
1859	3,457	1868	10,684	1877	10,379	1886	17
1860	5,467	1869	14,902	1878	8,468	1887	3
1861	7,518	1870	11,943	1879	9,189		
1862	3,633	1871	6,039	1880	7,011	Total,..	274,458
1863	7,214	1872	10,642	1881	20,727		

The first Chinese immigrants settled in San Francisco and Sacramento, and engaged in the laundry business. They spread thence in small numbers over nearly every part of the country. The establishment of the notorious

Six Companies in San Francisco led to increased immigration, as the companies advanced passage money, agreed to furnish employment, and send both the living and the bones of the dead back to China. The building of the various Pacific railroads enabled the Six Companies to make contracts for large numbers of Chinaman, and the largest immigrations were in the years of most active railroad building. But the competition of this class with native and other foreign labor soon raised a wide-spread antagonism against 'Chinese cheap labor.' Politicians inveighed loudly against this class, and while its members were being subjected to gross outrage, carried the question of their continued competition into state legislatures and ultimately into congress. The maltreatment of these people led to diplomatic correspondence between the United States and China; and after a projected treaty between the two countries had been rejected in the U. S. Senate, congress almost immediately passed the Chinese Exclusion Bill, which practically put an end to Chinese immigration.

NATIONALITY OF IMMIGRANTS, 1820–86.

Country.	Number.	Country.	Number.
England	1,358,406	Spain, Portugal	41,233
Ireland	3,242,919	Sweden, Norway	721,926
Scotland	267,357	Switzerland	146,022
Wales.	27,020	Other parts of Europe	6,8[illegible]
Other Parts of Gt. Brit.	793,267	Asia	291,015
Austria-Hung	278,414	Africa	1,109
Belgium......ary	34,014	British America	1,047,080
Denmark	109,586	Other parts of America	115,039
France	344,884	Pacific Islands	17,167
Germany	4,140,941	All other	225,316
Italy	227,194		
Netherlands	80,820	Total	13,701,851
Russia-Poland	184,305		

Of the 490,109 immigrants (in 1887) 140,938 reported themselves laborers, 30,932 farmers, 27,510 servants, 5,295 carpenters, 5,945 miners, 3,314 clerks, 3,769 tailors, 2,397 shoemakers, 2,280 blacksmiths, 2,882 professional men, 52,403 skilled laborers, and 210,751 unskilled and miscellaneous. Of the 546,889 (in 1888), 109,717 were from Germany, 84,233 England, 73,513 Ireland, 51,558 Italy, 54,698 Sweden, 24,457 Scotland, 18,264 Norway, 8,962 Denmark, 7,737 Switzerland, 6,454 France, 96,931 other parts of Europe (not specified), and 10,365 other parts of the world; and 418,423 landed at New York, 44,873 Boston, 37,325 Philadelphia, 33,297 Baltimore, and 12,971 at other custom ports. The arrivals in the fiscal year 1889 (438,614) showed a decrease from those of 1888 (546,889) of 108,275, the falling off being chiefly from Great Britain and Ireland (27,607) Italy (26,229), Norway and Sweden (24,196), Austria-Hungary (11,638), and Germany (10.133).

Beyond the migratory movements of various peoples incident to the extension of civilization and the means of personal comfort, special events and circumstances either in the United States or in foreign countries have at times greatly increased the inflow. Early Spaniards sought here the new Eldorado of which they had long dreamed; the Puritans came to secure religious freedom and to establish a Christian state; the Huguenots to escape persecution because of their faith. In later days famines have sent thousands from England and Ireland; the discovery of gold in Cal. attracted experienced miners from Australia; the Russian call to arms drove more than 100,000 peace-loving Mennonite farmers to Kan., Minn., Dak., and other great agricultural regions; 'Jew-baiting' in Austria and Germany caused the flight of multitudes of Hebrews to the United States; and more recently and most curiously the prohibition against the immigration of Chinese 'cheap-labor' has been taken somewhat as an invitation for Italian 'cheap-labor.' Since 1882 the immigration of Italian laborers has greatly increased, and a large amount of work on railroads and public improvements has been done by them, much to the alarm of those who opposed their predecessors from China.

Of modern immigration it is noted that a much larger population than formerly represents a productive and self-assisting if not self-supporting class; that through friends already settled in the new world or the agents of the great American railroads and the steamship companies that are found in all parts of Europe (see CLEARING HOUSE, RAILWAY), intending immigrants have their destinations fixed before leaving home; and that through federal laws enforced by collectors of customs at the chief American ports, the United States no longer furnishes an asylum for the support of the unskilled, pauper labor of the world. No person without means or acquaintances in the country financially able to guarantee that the new arrival will not become a public charge, is now allowed to land; and when the recent scheme of 'assisted immigration' took form in Ireland, and passage-money and nothing more was given poor people to help them to America, the law erected bars at the entering ports, and compelled the steamship companies to return the people to their own country. To these features must be added the alien labor contract law of 1888, which prohibits the landing in the United States of any foreigner engaged abroad to work in this country. This law was inspired by the Knights of Labor to prevent competition in work by skilled or other labor from European countries. But its provisions are so strict that it has already (1889) become a harsh, unjust measure. Clergymen engaged abroad to supply American pulpits, a number of professors for the new Rom. Cath. Univ. being erected in Washington, skilled workmen sent by a manufacturing house in England to erect the plant of a branch house in the United States; and the bookkeeper of a foreign firm sought to be transferred to its New York office, have either been prevented from landing, or if landed pending appeal to the treas. dept., been forced to return. In less than a year the law was found to work severities in directions never contemplated while it was undergoing adoption.

IMMINENT, a. *ĭm'mĭ-nĕnt* [F. *imminent*—from L. *imminen'tem*, hanging down over, threatening by its nearness—from *im*, in or on; *minērĕ*, to jut, to project: It. *imminente*]: impending; threatening; at hand; near. IM'MINENTLY, ad. *-lĭ*. IM'MINENCE, n. *-nĕns* [F.—L.]: that which is imminent; a threatening.

IMMISCIBLE, a. *ĭm-mĭs'sĭ-bl* [F. *immiscible*—from L. *im*, not; *miscērĕ*, to mix, to mingle]: in *OE.*, that cannot be mixed or mingled.

IMMISSION, n. *ĭm-mĭsh'ŭn* [L. *im*, into; *missus*, sent]: in *OE.*, the act of sending into; injection.

IMMIT, v. *ĭm-mĭt'* [L. *im*, into; *mittĕrĕ*, to send]: in *OE.*, to send into; to inject.

IMMITIGABLE: for UNMITIGABLE, which see; incapable of being mitigated or softened.

IMMOBILITY, n. *ĭm'mō-bĭl'ĭ-tĭ* [F. *immobilité*—from L. *immōbilitātem*, immovableness—from *im*, not; *mōbĭlĭs*, movable]: fixedness in place or state; want of motion, or resistance to it.

IMMODERATE. a. *ĭm-mŏd'ėr-āt* [L. *immŏdĕrātus*, without measure, unrestrained—from *im*, not; *modĕrātus*, moderate: F. *immodéré*]: exceeding just or usual bounds; excessive. IMMOD'ERATELY, ad. *-lĭ*. IMMOD'ERA'TION, n. *ā'shŭn*, and IMMOD'ERATENESS, n. want of moderation; excess.—SYN. of 'immoderate': inordinate; exorbitant; unreasonable; extravagant; intemperate.

IMMODEST, a. *ĭm-mŏd'ĕst* [F. *immodeste*, immodest—from L. *immŏdes'tus*, unrestrained—from *im*, not; *modes'tus*, modest: It. *immodesto*]: wanting in decency and delicacy; unchaste; impure; obscene. IMMOD'ESTLY, ad. *-lĭ*. IMMOD'ESTY, n. *-ĕst-ĭ* [F. *immodestie*]: want of delicacy or decent restraint; indecency.—SYN. of 'immodest': indecorous; indelicate; impudent; shameless; indecent; lewd.

IMMOLATE, v. *ĭm'mō-lāt* [L. *immŏlātus*, offered or sacrificed—from *im*, in or on; *mŏlă*, meal or coarse flour mixed with salt and thrown upon sacrifices—*lit.*, to put meal on a sacrifice]: to sacrifice; to offer in sacrifice; to kill, as a victim offered in sacrifice. IM'MOLATING, imp. IM'MOLATED, pp. *-lā-tĕd*, offered in sacrifice. IM'MOLATOR, n. *-tėr*, one who. IM'MOLA'TION, n. *-lā'shŭn* [F.—L.]: the act of sacrificing; a sacrifice offered.

IMMOMENT, a. *ĭm-mō'mĕnt* [*im*, not, and *moment*]: in *OE.*, trifling; of no importance or value.

IMMORAL, a. *ĭm-mŏr'ăl* [F. *immoral:* L. *im*, not, and *moral*]: contrary to the divine law; vicious; wicked or unjust. IMMOR'ALLY, ad. *-lĭ*. IMMORALITY, n. *ĭm'mō-răl'ĭ-tĭ* [F. *immoralité*]: any act contrary to the divine law; vice; wickedness.—SYN. of 'immoral': depraved; impure; unchaste; dissolute; obscene; debauched; licentious; abandoned; profligate; dishonest; unjust; wicked.

IMMORAL'ITY, in Law: a good defense to actions and suits, but it must be some immorality which runs counter to the well-known policy of the law. Thus, e.g., if a man gave a bond, or granted a deed, giving to a woman some annuity, with a view to induce her to live in concubinage, this would be a good defense against the bond or deed being enforced, for the law discountenances his conduct; whereas, if it were merely a bond, or a gift, in consideration of something of the same kind past and ended, the deed would be good. So the keeper of a house of ill-fame is not allowed to sue, and has no legal remedy against guests for any sum agreed to be paid for immoral purposes. In most other respects, the mere personal immorality of the parties who are litigants makes no difference whatever as to their respective remedies, for the law protects the bad as well as the good, the unjust as well as the just.

IMMORTAL, a. *ĭm-mŏr'tăl* [F. *immortel*—from L. *immortālĭs*, imperishable—from *im*, not; *mortālis*, subject to death: It. *immortale*]: exempt from death; imperishable; never-ending: N. one who is not liable to death; a divine being; a god or goddess. IMMOR'TALLY, ad. *-lĭ*. IM'MORTAL'ITY, n. *-tăl'ĭ-tĭ* [F. *immortalité*]: undying life; existence not limited; exemption from oblivion, as a poem. IMMOR'TALIZE, v. *-īz*, to render immortal; to cause to live or exist while the world endures. IMMOR'TALI'ZING, imp. IMMOR'TALIZED, pp. *-īzd*. IMMOR'TALS, n. plu. *-tălz*, a choice body of 10,000 foot-soldiers, so named by the anc. Persian kings, and forming their body-guard.—SYN. of 'immortal, a.': everlasting; endless; incorruptible; deathless; perpetual; ceaseless; continual; enduring; eternal.

IMMORTAL'ITY: continued existence of the human soul in a future state, and in a sphere now invisible, for ever free from the invasion of death. A distinction, often neglected, should be made between a mere future life, and I. proper, or the life that is eternally secure from death. 'If a man die, shall he live again?' is a question which has naturally agitated the heart and stimulated the intellectual curiosity of man, whenever he has risen above a state of barbarism, and begun to exercise his intellect at all. The religion of all civilized peoples may be said more or less to recognize the affirmitive of the question, is there for man a life after the death of the body?—though often under very vague and materialistic forms. Some of the most widely spread forms of belief in the world seem exceptions to this statement; for in Hinduism, the goal sought is absorption into the Universal Spirit, and therefore loss of individual existence, i.e, of the soul; while the pious Budhist strives for *Nirvana*, which is either complete extinction, or a state diffcult to be distinguished from extinction in the Western mind. Yet even here the belief in a future life (though not in immortality) exists in the form of the Transmigration of Souls (q.v.). In the ancient Egyptian religion, the idea of I. (at least so far as that idea is involved in the idea of *a life to come*) first assumes definite shape. There is a clear recognition of a dwelling-place of the dead and of a future judgment. Osiris, the beneficent god, judges the dead, and 'having weighed their heart in the scales of justice, he sends the wicked to regions of darkness while the just are sent to dwell with the god of light.' The just, we read on an inscription, 'found favor before the great God; they dwell in glory where they live a heavenly life; the bodies they have quitted will forever repose in their tombs, while they rejoice in the life of the supreme God.' I. is plainly taught, but bound up with the idea of the preservation of the body, to which the Egyptians attached great importance, as a condition of the soul's continued life; hence they built vast tombs and embalmed their bodies, as if to last forever, In the Zoroastrian religion, the future world, with its governing spirits, fills a prominent part. Under Ormuz and Ahriman, there are ranged regular hierarchies of spirits engaged in perpetual conflict; and the soul passes into the kingdom of light or of darkness, over which these spirits respectively preside, according as it has lived well or ill on the earth. Whoever has lived in purity and has not suffered the *divs* (evil spirits) to have any power over him, passes after death into the realms of light. In the early Grecian paganism, Hades or the realms of the dead, is the emblem of gloom to the Hellenic imagination. 'Achilles, the ideal hero, declares that he would rather till the ground than live in pale Elysium.' This melancholy view of the future everywhere pervades the Homeric religion. With the progress of Hellenic thought, a higher idea of the future is found to characterize both the poetry and philosophy of Greece, till in the Platonic Socrates, the conception of I. shines forth with a clearness impressive in contrast with the almost universal dimness and vagueness of the pagan thought on this question. In the *Apology* and the *Phædo*, Socrates discourses of the doctrine of the soul's I., in language rich in faith and in beauty 'The soul, the immaterial part, being of the nature so superior to the body, can it,' he asks in the *Phædo*, 'as soon as it is separated from the body; be dispersed into nothing and perish? Oh, far otherwise. Rather will this be the result. If it take its departure in a state of purity, not carrying with it any clinging impurities of the body, impurities which during life it never willingly shared in, but always avoided, gathering itself into itself, and making the separation from the body its aim and study—that is, devoting itself to true philosophy, and studying how to die calmly; for this is true philosophy, is it not?—well, then, so prepared, the soul departs into that invisible region which is of its own nature, the region of the divine, the immortal, the wise; and then its lot is to be happy in a state in which it is freed from fears and wild desires, and the other evils of humanity, and spends the rest of its existence with the gods.' Such clearness of belief, however, was shared by very few of the ancient philosophers, and scarcely at all by men at large; though doubtless the natural human yearning for I. made always some vague and feeble assertion of itself.

It is only in Christianity that I. as the higher life beyond all death is clearly revealed as a reward not merely to the true philosopher, as according to the view of Socrates, but to every humble and godly soul. Christ 'hath brought life and immortality to light by the gospel.' 'God, according to his great mercy, begat us again unto a living hope by the resurrection of Jesus Christ from the dead, unto an inheritance incorruptible and undefiled, and that fadeth not away, reserved in heaven.' It is undoubtedly owing to Christianity that the doctrine of the soul's I. has become a common and well-recognized truth—no mere result of speculation, nor product of priestly invention—but a light to the reason, and a guide to the conscience and to the conduct. The vague aspirations of philosophy, and the gross conceptions of mythology, are found in the gospel transmuted into an authoritative influence, governing and directing the present life. The Scriptures confine their direct and unqualified assertions of deathlessness to the godly; while they predict 'death' for the ungodly. But the nature of this 'death' is not revealed; and it is asserting more than we can now know to assert that it is extinction of being. On both sides of this question it is wise for us to limit our positive assertions to our actual knowledge. If we follow the Scriptures in our use of words—while we may not deny some kind of continued and even unending existence to all men—we shall apply the term Immortality (freedom from death) only to the godly.—See HEAVEN: HELL.

IMMORTELLE, n. *ĭm'mŏr-tĕl'* [F.: see IMMORTAL]: the flower commonly called *everlasting-flower;* a wreath made of these flowers: see EVERLASTING FLOWER.

IMMOVABLE, a. *ĭm-môv'ă-bl* [L. *im*, not, and *movable*]: that cannot be moved from its place; fixed; unalterable; steadfast as regards purpose. IMMOV'ABLY, ad. *-blĭ*. IMMOV'ABLENESS, n. *-bl-nĕs*, state of being immovable. IMMOV'ABIL'ITY, n. *-bĭl'ĭ-tĭ*, incapability of being moved. IMMOV'ABLES, n. plu. *-ă-blz*, lands; houses; fixtures.

IMMUNITY, n. *ĭm-mū'nĭ-tĭ* [F. *immunité*—from L. *immūnĭtātĕm*, freedom or exemption—from *im*, not; *mūnŭs*, service, duty: It. *immunita*]: exemption from any obligation or duty; freedom; particular privilege.

IMMURE, v. *ĭm-mūr'* [OF. *emurer*, to immure or wall about—from *em*, in, within; *murer*, to wall: L. *im*, in or into; *mūrŭs*, a wall: comp. Gael. *mur*, a wall]: to inclose within walls; to shut up; to confine; to imprison. IMMU'RING, imp. placing within walls in restraint, or as a punishment. IMMURED'., pp. *-mūrd'*. IMMURES, n. plu. *ĭm-mūrz'*, in *OE.*, walls; inclosures.

IMMUTABLE, a. *ĭm-mū'tă-bl* [F. *immutable*—from L. *immūtābĭlĭs*, unchangeable—from L. *im*, not, and *muto*, I change: It. *immutabile*]: unchangeable; unalterable; not capable of change. IMMU'TABLY, ad. *-blĭ*. IMMU'TABIL'ITY, a. *bĭl'ĭ-tĭ* [F. *immutabilité*]: and IMMU'TABLENESS, n. *-bl-nĕs*, unchangeableness; that quality that renders change impossible.

IMOLA, *ē'mō-lâ* (anc. *Forum Cornelii*, or *Forum Syllæ*): town of Italy, province of Bologna, in a fruitful plain adjoining picturesque hills, close to the river Santerno, 24 m. w.s.w. of Ravenna. It contains some fine palaces, churches, theatres, and benevolent institutions. I. has some good manufactures of wax, oil, majolica, silk, and glass, besides extensive leather-curing establishments, and brick and tile-works. From a species of white grape grown in the vicinity, the delicious wine known as *vin santo* is manufactured. Pop. (1881) 9,275.

IMO'SCHI: town of the Austrian empire, in Dalmatia; n. lat. 43° 30′, e. long. 17° 15′. It has markets twice a week, much frequented by Turks. Pop. (1880) 27,443.

IMP, n. *ĭmp* [mid. L. *impŏtus*, a graft: Sw. *ymp*, a shoot or scion: AS. *impan;* O.H.G. *impiton;* Ger. *impfen*, to graft]: in *OE.*, a scion or son, originally always in a good sense, as in Henry VIII.'s reign, Prince Edward is called 'that goodly *imp*'; a shoot; a child; generally in a bad sense, as 'an imp of hell'; a little devil: V. in *OE.*, to graft; to lengthen or extend. Imp'ing, imp. Imped, pp. *ĭmpt.* Impish, a. *ĭmp'ĭsh*, somewhat like an imp. Imp of darkness, son of darkness; the devil.

IMPACABLE, a. *ĭm-pā'kă-bl* [L. *im*, not; mid. L. *pacābĭlĭs*, surrendered, delivered—from *pācĕm*, peace]: in *OE.*, not to be softened or appeased.

IMPACT, n. *ĭm'păkt* [L. *impac'tus*, driven furiously into—from *im*, into; *pango*, I drive in]: in *mech.*, the shock of two bodies coming together; touch; impression: V. *ĭm-păkt'*, to drive close or hard; to press or drive firmly together. Impact'ing, imp. Impact'ed, pp. Impaction, n. *ĭm-păk'shŭn*, a disease in cattle, sheep, horse, fowls, etc., in which the food becomes closely impacted in the stomach —becoming hard and dry, the food is incapable of digestion, and the animal shortly dies; the stomach-staggers.

IMPAGES, n. plu. *ĭm-pā'jēz* [L. *impāgēs*]: in *arch.*, the horizontal parts of the framework of a door.

IMPAIR, v. *ĭm-pār'* [F. *empirer;* OF. *empeirer*, to impair, to make worse—from L. *im*, intensive; *pejor*, worse]: to make worse; to diminish in value, excellence, or quality. Impair'ing, imp. Impaired', pp. *-pārd':* Adj. made worse; injured. Impair'er, n. *-ėr*, one who.—Syn. of 'impair': to weaken; enfeeble; diminish; decrease; injure.

IMPALE [see Empale], in Heraldry: to arrange two coats of arms side by side in one shield divided per pale. It is usual thus to exhibit the conjoined coats of husband and wife, the husband's arms occupying the dexter side or place of honor, and the wife's the sinister side of the escutcheon. When a man marries a second wife, heralds say that he may divide the sinister half of the shield per fess into two compartments, placing the family arms of his deceased wife in chief, and of his second wife in base. A husband impaling his wife's coat with his own, is not allowed to surround the former with the collar or insignia of any order of knighthood to which he may

Impale.

belong. Bishops, deans, heads of colleges, and kings-of-arms, impale their arms with their insignia of office, giving the dexter side to the former. In early heraldry, when two coats were represented in one shield side by side, only half of each was exhibited, an arrangement which has been called *dimidiation*. Sometimes the one coat only was dimidiated. A reminiscence of dimidiation is preserved in the practice of omitting bordures, orles, and tressures in impaled arms on the side bounded by the line of impalement.

IMPALE, IMPALEMENT: see EMPALE.

IMPALPABLE, a. *ĭm-păl'pă-bl* [F. *impalpable*—from L. *impalpābĭlĭs*—from *im*, not; *palpo*, I touch softly]: not perceptible by the touch; extremely fine, as powder or dust in which no gritty particles can be felt by the touch. IMPAL'PABLY, ad. *-blĭ*. IMPAL'PABIL'ITY, n. *-bĭl'ĭ-tĭ*, the quality of not being perceptible by the touch.

IMPANATION, n. *ĭm'pă-nā'shŭn* [L. *im*, into; *panis*, bread: F. *impanation*]: technical word employed in the Eucharistic controversies to express the peculiar opinion propounded by Luther as to the nature of the presence of Christ in the emblems of bread and wine at the Lord's Supper. Differing from the Rom. Catholics in denying the transubstantiation of the bread and wine, and from the Sacramentarians in denying that our Lord's presence was merely typical or figurative, Luther contended that the body and blood of Christ were really present in, or united with, the elements of bread and wine, without a change in the nature of those elements; in a manner analagous to that in which the divinity of Christ co-exists in the same person with his human nature. Hence, by an analogy with the word incarnation, he devised for the Eucharistic union the term impanation. This doctrine was the subject of a lengthened controversy with Zwingli at Marburg 1529, which left each party unconvinced; and this theory still continues the received one in the orthodox Lutheran schools.

IMPANEL, v. *ĭm-păn'ĕl* [*im*, in or on, and *pannel*, a schedule or piece of parchment (see PANEL)]: to enrol the names of a jury in a court of justice in a schedule or piece of parchment; spelled also IMPANNEL. IMPANELLING, or IMPAN'ELING, imp. IMPANELLED, or IMPAN'ELED, pp. *-nĕld*.

IMPARADISE, v. *ĭm-păr'ă-dīs* [*im*, and *paradise:* It. *imparadisare*, to imparadise]: to make happy, as if in paradise; to put into a place or state resembling paradise. IMPAR'ADISING, imp. IMPAR'ADISED, pp. *-dīst*.

IMPARIDIGITATE, a. *ĭm-păr-ĭ-dĭj'ĭ-tāt* [L. *impar*, unequal; Eng. *digitate*]: in *comp. anat.*, having an odd number of toes as one, three, or five; as in the horse, rhinoceros, etc.

IMPARIPINNATE, a. *ĭm'păr-ĭ-pĭn'nāt* [L. *impar*, unequal; *pinnātus*, winged]: in *bot.*, unequally pinnate; pinnate, but ending in an odd leaflet.

IMPARISYLLABIC, a. *ĭm-păr′ĭ-sĭl-lăb′ĭk* [L. *impar*, unequal; *syllăbă*, a syllable]: in *gram.*, not having the same number of syllables—applied to nouns increasing their syllables in the oblique cases, as *mens*, the mind—gen. *mentis*, of the mind.

IMPARITY, n. *ĭm-păr′ĭ-tĭ* [L. *impar*, unequal: F. *impair*, unequal, odd]: not divisible into equal parts; inequality; difference in degree of rank or excellence.

IMPARK, v. *ĭm-pârk′* [*im*, in or on, and *park*]: to inclose, as land for a park. **Impark′ing**, imp. **Imparked′**, pp. *-pârkt′*.

IMPART, v. *ĭm-pârt′* [OF. *impartir*—from L. *impartīrĕ*, to share with another—from *im*, into; *pars*, or *partem*, a part: Sp. *impartir*, to impart]: to bestow or give; to communicate; to convey; to make known. **Impart′ing**, imp. **Impart′ed**, pp. **Impart′er**, n. one who. **Impart′ible**, a. *-ĭ-bl*, that may be imparted or communicated. **Impart′ibil′ity**, n. *-bĭl′ĭ-tĭ*, quality of being impartible.—**Syn.** of ‘impart’: to confer; grant; give; discover; divulge; share; yield; reveal; disclose; bestow; show.

IMPARTIAL, a. *ĭm-pâr′shăl* [*im*, not, and *partial*: F. *impartial*]: not disposed to favor one more than another; unbiassed; just. **Impar′tially**, ad. *-lĭ*. **Impar′tial′ity**, n. *-shĭ-ăl′ĭ-tĭ* [F. *impartialité*]: freedom from bias or prejudice in opinion or judgment.

IMPARTIBLE: see under **Impart**.

IMPARTMENT, n. *ĭm-pârt′mĕnt* [see **Impart**]: in *OE.*, disclosure of some knowledge or information; a communication.

IMPASSABLE, a. *ĭm-păs′să-bl* [*im*, not, and *passable*]: that cannot be passed; not admitting a passage. **Impas′sably**, ad. *-blĭ*. **Impas′sableness**, n. *-bl-nĕs*, the state of being impassable.—**Syn.** of ‘impassable’: impervious; impenetrable; pathless.

IMPASSIBLE, a. *ĭm-păs′sĭ-bl* [F. *impassible*, calm, tranquil: It. *impassibile*, that cannot suffer—from L. *impassĭb′ĭlĭs*—from *im*, not; *passus*, suffered]: incapable of pain, passion, or suffering; that cannot be affected or disturbed by external causes. **Im′passibil′ity**, n. *-bĭl′ĭ-tĭ* [F. *impassibilité*]: also **Impas′sibleness**, n. *-bl-nĕs*, exemption from pain or suffering; insusceptibility of being affected or injured by external things. **Impas′sive**, a. *-păs′sĭv* [L. *im*, not; *passus*, suffered]: not susceptible of pain or suffering; free from emotion of any kind. **Impas′sively**, ad. *-lĭ*. **Impas′siveness**, n. the state of being insensible of pain.

IMPASSION, v. *ĭm-păsh′ŭn* [*im*, into, and *passion*]: to move or affect strongly with passion. **Impas′sioning**, imp. **Impas′sioned**, pp. *-ŭnd*: **Adj.** marked by passion or feeling, as a speech; excited; glowing; having the feelings excited, as a speaker. **Impas′sionable**, a. *-ă-bl*, excitable. **Impas′sionably**, ad. *-blĭ*.

IMPASSIVE, IMPASSIVENESS: see under **Impassible**.

IMPASTE, v. *ĭm-pāst′* [*im*, in or on, and *paste*]: to form into or cover, as with paste; to lay on colors. IMPAST′ING, imp. IMPAST′ED, pp. IM′PASTA′TION, n. *-păs-tā′shŭn*, the union of different substances by means of cements. IMPASTO, n. *ĭm-păs′tō* [It.]: a style of art in which pigments are applied to an appreciable thickness forming figures in low relief; generally, a term expressing the thickness of the layer of pigment applied by the painter to his canvas.

IMPATIENT, a. *ĭm-pā′shĕnt* [F. *impatient*—from L. *impatĭen′tem*, that cannot bear—from *im*, not; *patĭĕns*, suffering]: uneasy or fretful under suffering or delay; not enduring; hasty. IMPA′TIENCE, n. *-shĕns* [F.—L.]: restlessness; uneasiness under pain or suffering; restless discontentment under any condition, with eagerness to change it. IMPA′TIENTLY, ad. *-lĭ.*—SYN. of ‘impatient’: hot; eager; uneasy; fretful; intolerant.

IMPAWN, v. *ĭm-pawn′* [*im*, into, and *pawn*]: to pledge; to deposit as a security. IMPAWN′ING, imp. IMPAWNED′, pp. *-pawnd′*.

IMPEACH, v. *ĭm-pēch′* [F. *empêcher*, to hinder: OF. *empacher*, to encumber, to hinder, from the notion of entangling with a sticky material—from mid. L. *impactārĕ*, to bind, to fasten]: to charge with a crime or misdemeanor; to charge with treason or high public crimes, as a minister of state; to call in question. IMPEACH and IMPEACHMENT, in *OE.*, hindrance. IMPEACH′ING, imp. IMPEACHED′, pp. *-pēcht′*. IMPEACH′ER, n. *-ėr*, one who. IMPEACH′ABLE, a. *-ă-bl*, liable to accusation. IMPEACH′MENT, n. *-mĕnt*, a charge or accusation; an endeavor to *fasten* a charge of treason on a person; an accusation and prosecution for treason or other high crimes or misdemeanors.—SYN. of ‘impeach, v.’: to arraign; accuse; criminate; censure; indict; charge; cite; in *OE.*, hinder; impede.

IMPEACH′MENT: accusation and trial of a peer or member of parliament in England, or indeed, any other person, before the high court of parliament, for treason, or some high crime or misdemeanor. This kind of trial is reserved for great and enormous offenders, particularly in matters affecting the constitution; for the ordinary tribunals generally suffice for all cases of crimes. I., accordingly, is of rare occurrence, the last instance being that of Lord Melville 1805; but it remains one of the high prerogatives of parliament to try offenders in this way. The proceedings nearly resemble an ordinary trial at law. A pardon by the crown is not pleadable in bar of the prosecution, though, after sentence, the crown may pardon the offender. See BILL OF ATTAINDER.

IMPEACHMENT OF THE PRESIDENT OF THE UNITED STATES, and of other civil officers.—The constitution of the United States provides (Art. 1, Sec. 3), that the senate shall have the sole power to try all impeachments, that senators sitting for that purpose shall be on oath or affirmation, that the chief-justice shall preside over the trial of the pres., and that the concurrence of two-thirds of the members present shall be necessary to convict. Under this organic law the house of representatives impeaches or makes the charges against the pres., the articles of impeachment being practically the same as the counts in an indictment. The impeachment is sent to the senate, a copy is served on the accused, and the house of representatives appoints a committee of its members as 'managers' or prosecutors of the impeachment. When the senate is convened as a court, the managers on the part of the house and the counsel for the accused are summoned to appear before it; and the trial proceeds much the same as trials of other causes of large interest. In the impeachment of other officers of the federal govt. the same course is pursued excepting that the pres. of the senate presides. In state constitutions a variety of procedures is provided, but the general course is similar to that under the U. S. constitution, the lower house impeaching, the upper house trying, the governor occupying relatively the place of the pres., and the chief-justice of the state or of its highest court that of the chief-justice of the United States.

IMPEACHMENT OF WASTE: expression in English law, used in deeds or wills. When an estate is given to a person for life, or for a term of years, *without impeachment of waste*, the tenant is entitled to cut timber, and do many things on the estate which otherwise he would be forbidden to do. Still, he is not allowed to do what he likes, for if he abuse his power and attempt to cut down ornamental timber, for example, or deface the family mansion, the court of chancery will interfere by injunction to prevent this.

IMPEARL, v. *ĭm-pėrl′* [*im*, in or on, and *pearl*]: to decorate with pearls or the resemblance of them; to form in resemblance of pearls.

IMPECCABLE, a. *ĭm-pĕk′kă-bl* [F. *impeccable*—from L. *impeccābĭlĭs*, faultless, sinless—from *im*, not; *pecco*, I err or sin]: not liable or subject to sin. **Impec′cabil′ity,** n. *-bĭl′-ĭ-tĭ* [F. *impeccabilité*]: exemption from sin or error. **Impec′cancy,** n. *-kăn-sĭ*, sinlessness.

IMPECUNIOUS, a. *ĭm′pĕ-kū′nĭ-ŭs* [L. *in*, not; *pecūnĭă*, money]: without money; poor. **Im′pecunios′ity,** n. *-ŏs′ĭ-tĭ*, the want of money.

IMPEDE, v. *ĭm-pēd′* [L. *impĕdīrĕ*, to hamper or hinder —from *im*, into; *pĕdēs*, feet]: to hinder; to stop progress. **Impe′ding,** imp. **Impe′ded,** pp. **Impediment,** n. *ĭm-pĕd′ĭ-mĕnt*, an obstruction; a hindrance; a defect, as in speech. **Imped′imen′tal,** a. *-mĕn′tăl*, hindering. **Imped′itive,** a. *-tĭv*, causing hindrance.—Syn. of 'impediment'. obstacle: difficulty; clog.

IMPEL, v. *ĭm-pĕl′* [L. *impel′lĕrĕ*, to drive forward—from *im*, into; *pello*, I drive]: to drive or urge forward; to excite to action; to incite. **Impel′ling,** imp.: Adj. urging; pressing. **Impelled′,** pp. *-pĕld′*. **Impel′ler,** n. *-lėr*, one who. **Impel′lent,** a. *-lĕnt*, a power or force which drives forward.—SYN. of 'impel': to induce; influence; actuate; move; instigate.

IMPEND, v. *ĭm-pĕnd'* [L. *impendĕrĕ*, to hang over, to threaten—from *im*, into; *pendĕō*, I hang]: to hang over; to menace or threaten; to be approaching and ready to fall on. IMPEN'DING, imp.: ADJ. imminent; threatening. IMPEN'DED, pp. IMPEN'DENT, a. *-dĕnt*, hanging over. threatening. IMPEN'DENCE, n. *-dĕns*, or IMPEN'DENCY, n; *-dĕn-sĭ*, the state of hanging over.

IMPENETRABLE, a. *ĭm-pĕn'ĕ-tră-bl* [F. *impénétrable*—from L. *impĕnetrābĭlĭs*, that cannot be penetrated—from *im*, not; *pĕnĕtrō*, I penetrate or enter]: that cannot be pierced; not to be affected or moved, as by the sight or the mind; not to be entered. IMPEN'ETRABLY, ad. *-blĭ*. IMPEN'ETRABIL'ITY, n. *-bĭl'ĭ-tĭ* [F. *impénétrabilité*]: one of the essential properties of matter, implying that no two bodies can at the same time occupy the same space. If a nail be driven into a piece of wood, it does not, properly speaking, *penetrate* the substance or matter of the wood, for the fibres are driven aside before the nail can enter. If a vessel be filled with fluid, and a solid body be then placed in it, as much water will run over as is equal in bulk to the solid body, in this way making room for it. The lightest gases are really as impenetrable as the densest solid; though, owing to their compressibility, it is not readily made apparent.—Impenetrability, in figurative use, denotes obtuseness, incapability of being moved or affected.—SYN. of 'impenetrable': inaccessible; unimpressible; unsearchable; inscrutable.

IMPENITENT, a. *ĭm-pĕn'ĭ-tĕnt* [F. *impénitent*, impenitent—from L. *impœnĭten'tĕm*—from *im*, not; *pœnĭtens*, repenting: It. *impenitente*, impenitent]: not repenting of sin; obdurate; not contrite: N. a hardened sinner. IMPEN'ITENTLY, ad. *-lĭ*. IMPEN'ITENCE, n. *-tĕns* [F.—L.]: or IMPEN'ITENCY, n. *-sĭ*, want of repentance; hardness of heart; want of remorse for crimes.

IMPENNATE, a. *ĭm-pĕn'nāt* [*im*, not, and Eng. *pennate*—from L. *penna*, a feather]: having very short wings, and useless for flight; of the tribe IM'PENNA'TES, *-nā'tēz*, swimming birds having short wings covered with rudimentary feathers resembling scales; e.g., the penguin, and the great auk. Such birds are usually placed in the family *Brevipennatæ*, ord. *Natatores:* see PENGUIN: AUK: DIVER: GREBE: GUILLEMOT.

IMPERATIVE, a. *ĭm-pĕr'ă-tĭv* [F. *impératif*, imperative, imperious—from mid. L. *imperatīvŭs*, due to a command: It. *imperativo*, fit for command, imperative—from L. *impĕrō*, I command]: expressing or containing positive command or desire; positive; authoritative; in *gram.*, the simple form of the verb, which expresses command or exhortation, as *go, eat, sing*. IMPER'ATIVELY, ad. *-lĭ*. CATEGORICAL IMPERATIVE, in the *system of Kant* (q.v), the absolute law of duty, with no possibility of evasion. According to Kant, man, in the consciousness of his moral liberty, recognizes two great laws regulating his will; the first prompts him to seek his own well-being, the second *commands* him to be virtuous, even at the sacrifice of that. From this opposition in his moral nature between desire and conscience, springs up the idea of duty, which, in the Kantian terminology, is called the 'moral imperative,' to which Kant adds the epithet *categorical*, to indicate that its commands are absolute and unconditional.

IMPERA'TOR: see EMPEROR.

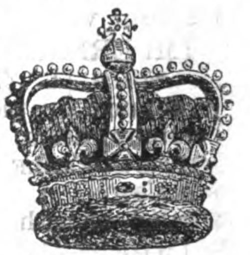
IMPERCEPTIBLE, a. *ĭm'pėr-sĕp'tĭ-bl* [F. *imperceptible*—from *im*, not, and *perceptible*]: not to be known or discovered by the senses; very small or fine; very slow in motion or growth. IM'PERCEP'TIBLY, ad. *-tĭ-blĭ.* IM'PERCEP'TIBLENESS, n. *-bl-nĕs.*

IMPERFECT, a. *ĭm-pėr'fĕkt* [OF. *imperfeit*, or *imperfaict*—from L. *imperfec'tus*, incomplete—from *im*, not; *perfectus*, complete]: not completed or finished; defective; liable to err; in *gram.*, applied to the tense of a verb expressing unfinished action, as I *was eating*—see below. IMPER'FECTLY, ad. *-lĭ.* IM'PERFEC'TION, n. *-fĕk'shŭn* [F.—L.]: the state of being defective; a fault or blemish. IMPER'FECTNESS, n. state of being imperfect. IMPERFECTIBLE, a. *ĭm'pėr-fĕkt'ĭ-bl*, incapable of being made perfect; that cannot be improved. IM'PERFECTIBIL'ITY, n. *-ĭ-bĭl'ĭ-tĭ*, the state of being unable to be made perfect. IMPERFECT TENSE, in *gram.*, a tense expressing action begun in the past, going on now, and not yet completed. IMPERFECT-OBLIGATIONS, n. in *law*, obligations such as those of charity, gratitude, etc., which cannot be enforced by law.—SYN. of 'imperfection': failing; failure; weakness; frailty; foible; infirmity; fault; defect; deficiency; incompleteness; blemish; vice.

IMPERFORATE, a. *ĭm-pėr'fō-rāt*, or IMPER'FORATED, a. *-rā-tĕd* [L. *im*, not; *perfŏrātŭs*, bored through]: not perforated or pierced; having no opening or passage of communication; in *bot.*, without a terminal opening. IMPER'FORABLE, a. *-ră-bl*, that cannot be pierced. IMPER'FORA'TION, n. *-rā'shŭn* [F.—L.]: state of being not perforated, or without an aperture.

IMPERIAL, a. *ĭm-pē'rĭ-ăl* [F. *impérial*—from L. *impĕrĭālĭs*, of the empire, imperial—from *impĕrō*, I command; *impĕrĭŭm*, command, empire: It. *imperiale*]: pertaining to an empire or emperor; royal; supreme; anything larger than the usual size, or better than the usual quality. IMPE'RIALIZE, v. *-ăl-īz*, to invest with an imperial character and tone. IMPE'RIALI'ZING, imp. IMPE'RIALIZED, pp. *-īzd.* IMPE'RIALLY, ad. *-lĭ.* IMPE'RIALISM, n. *-ĭzm*, system or state of imperial government. IMPE'RIALIST, n. *-ĭst*, one who belongs to or supports an emperor—particularly applied to the Germans under the old empire. IMPE'RIAL'ITY, n. *-ăl'ĭ-tĭ*, or IMPE'RIALTY, n. *-ăl-tĭ*, the right of an emperor over a certain share of the produce of mines, etc.; imperial power. IMPERIAL LIQUID, see CREAM OF TARTAR. IMPERIAL WEIGHTS AND MEASURES, those enacted by Parliament as the legal standards for use in trade and commerce, and generally in ordinary dealings throughout the empire, in contradistinction to local and illegal weights and measures. *Note.*—**IMPERIALISM**, or **CÆSARISM**, as a party name, denotes the supposed government of a ministry, or the personal government of a minister of a constitutional country, hardly within the limits of the constitution; the supposed exercise of such a power as belongs to a despotic government.

IMPE'RIAL CROWN: properly the crown borne by the German emperor; in form, a circle of gold, adorned with precious stones and *fleurs-de-lis*, bordered and seeded with pearls, and raised in the form of a cap voided at the top like a crescent. From the middle of the cap rises an arched fillet enriched with pearls, and surmounted by a globe, on which is a cross of pearls. The name Imperial Crown is, however, in English heraldry, applied to the crown worn in times past by the kings of England. From the 12th c. onward, the crown of the English sovereigns underwent repeated changes in form and enrichment. That of Edward II. was formed of four large and four small strawberry leaves, rising in curves from the jewelled circlet, and having eight small flowers alternating with the leaves. In Henry IV.'s crown, eight strawberry leaves, and as many *fleurs-de-lis* alternated with 16 small groups of pearls, three in each. Under Henry V. the enriched circlet was for the first time arched over with jewelled bands of gold, and the apex of the arches surmounted with a mound and cross, while *crosses patées* were substituted for the strawberry leaves, and roses or *fleurs-de-lis* for the clusters of pearls. The arches, at first numerous and elevated to a point, became, in later times, restricted to four, and depressed in the centre. The imperial crown of heraldry, as now understood, is, in fact, the form of crown worn by the English sovereigns from Charles II. to William IV., as represented in the subjoined cut. It has four *crosses patées*, and four *fleurs-de-lis* set alternately on the circlet, while four pearl-studded arches, rising from within the crosses, carry at their intersection the mound and cross. The state crown of Queen Victoria differs considerably from this, having a far more enriched character. It is covered with diamonds and studded with gems, and the arches are wrought into wreaths of rose, thistle, and shamrock formed of brilliants. A charge, crest, or supporter, crowned with a regal crown, is said to be *imperially crowned.*


Imperial Crown.

IMPERIL, v. *ĭm-pĕr'ĭl* [*ĭm*, into, and *peril*]: to bring or lead into danger. IMPERILLING, or IMPER'ILING, imp. IMPERILLED, or IMPER'ILED, pp. *-ĭld.*

IMPERIOUS, a. *ĭm-pē'rĭ-ŭs* [L. *impĕrĭōsŭs*, possessed of command, domineering—from *impĕrĭŭm*, a command: F. *impérieux*]: assuming or exercising authority in a manner highly offensive to others; haughty; overbearing;

not capable of being resisted; urgent. IMPE'RIOUSLY, ad. *-lĭ.* IMPE'RIOUSNESS, n. *-nĕs,* a dictatorial and bold contempt for the rights or feelings of another; haughtiness.—SYN. of 'imperious': dictatorial; authoritative; imperative; commanding; domineering; lordly; tyrannical; despotic; arrogant; pressing; powerful; ascendant.

IMPERISHABLE, a. *ĭm-pĕr'ĭsh-ă-bl* [F. *impérissable:* L. *im,* not, and Eng. *perishable*]: not subject to decay; indestructible; calculated to last always. IMPER'ISHABLY, ad. *-blĭ.* IMPER'ISHABLENESS, n. *-bl-nĕs.*

IMPE'RIUM: word used in the Roman law in various senses, the most important of which is that which it bears when applied to consuls and proconsuls—thence called imperatores. Most of the superior magistrates were also intrusted with the imperium, which meant a sovereign authority. It is of little practical importance in modern times to trace the extent or precise nature of the authority thus designated, as the subject has no bearing on modern law.

IMPERMANENT, a. *ĭm-pėr'ma-nĕnt:* not permanent; not lasting; not enduring.

IMPERMEABLE, a. *ĭm-pėr'mē-ă-bl* [F. *imperméable,* impervious—from L. *im,* not; *permĕō,* I penetrate]: not admitting the passage of water or other liquid through; rendered waterproof by the application of a solution. IMPER'MEABLY, ad. *-blĭ.* IMPER'MEABLENESS, n. *-bl-nĕs,* or IMPER'MEABIL'ITY, n. *-bĭl'ĭ-tĭ,* the state or quality of being impermeable.

IMPERSONAL, a. *ĭm-pėr'sŏn-ăl* [F. *impersonnel,* impersonal—from L. *impersōnālis*—from *im,* not, and *persōnă,* a character, a person]: not personal; not having personality. IMPER'SONAL'ITY, n. *-ăl'ĭ-tĭ,* the want or absence of personality. IMPER'SONALLY, ad. *-ăl-lĭ.* IMPERSONAL VERBS, those verbs which are used only in the 3d pers. sing. of each tense, with the pron. *it* as a nominative, as 'it rains,' 'it snows': perhaps also the form in the first person, 'methinks' = 'it seems to me.'

IMPERSONATE, v. *ĭm-pėr'sŏn-āt* [*im,* in or on, and *personate*]: to ascribe the qualities of a person to a thing; to represent things as persons; to personify. IMPER'SONATING, imp. IMPER'SONATED, pp. IMPER'SONA'TION, n. *-ā'shŭn,* the act of representing things as persons.

IMPERTINENT, a. *ĭm-pėr'tĭ-nĕnt* [F. *impertinent,* impertinent—from mid. L. *impertĭnen'tem: im,* not, and Eng. *pertinent*]: rude; unmannerly; impudent; meddling unduly with the matters of others: N. one rude or unbecoming in behavior. IMPER'TINENTLY, ad. *-lĭ.* IMPER'TINENCE, n. *-nĕns* [F.—L.]: rudeness; improper interference not becoming age or station; in *law,* irrelevant matter introduced into an affidavit or pleading—generally ordered by the court to be stricken out. IMPER'TINENCY, n. *-nĕn-sĭ,* state of being troublesome and intrusive; sauciness; rudeness; in *OE.,* that which is of no weight or importance; something not belonging to the subject; a trifle; a thing of no value.—SYN. of 'impertinent, a.': trifling; frivolous; insolent; officious; importunate; intrusive; meddling; saucy; in *OE.*, irrelevant; inapplicable; misplaced; trifling; foolish.

IMPERTURBABLE, a. *ĭm'pėr-tėrb'ă-bl* [F. *imperturbable*—from mid. L. *imperturbābĭlĭs:* L. *im*, not; *perturbātŭs*, confused or disturbed utterly]: that cannot be disquieted or disturbed. **IM'PERTURB'ABLY**, ad. *-blĭ.* **IMPER'TURBA'TION**, n. *-bā'shŭn*, calmness; freedom from agitation of mind. **IM'PERTURB'ABIL'ITY**, n. *-bĭl'ĭ-tĭ* [F. *imperturbabilité*]: self-possession; coolness.

IMPERVIOUS, a. *ĭm-pėr'vĭ-ŭs* [L. *impervĭŭs*, that cannot be passed through—from *im*, not; *pervĭŭs* passable: It. *impervio*]: not penetrable; not to be pierced; affording no way or passage. **IMPER'VIOUSLY**, ad. *-lĭ.* **IMPER'VIOUSNESS**, n. *-nĕs*, the state of not admitting a passage. **IMPER'VIABLE**, a. *-vĭ-ă-bl*, impervious.—SYN. of 'impervious': impassable; pathless; impenetrable.

IMPETIGO, n- *ĭm'p`-tī'gō* [L. *impĕtīgo*, a scabby eruption—from *impĕtō*, I attack: F. *impétigo*]: skin disease characterized by clusters of pustules, which may either be scattered or in groups. These pustules burst, dry up, and become covered with scabs or crusts of a yellow color, not unlike little masses of candied honey. From beneath these crusts, a purulent discharge commonly takes place; the crusts become thicker and larger, and the skin around and beneath them is red and raw. The disease may be either acute or chronic. In the former case, it is attended with febrile symptoms, which must be combated by the internal administration of purgatives and alkalies, strict attention to diet, and weak alkaline lotions. In chronic cases, the discharge may be checked by a lotion containing ten or fifteen grains of oxide of zinc in an ounce of rose-water.

There are various forms of this complaint, as *I. figurata*, *I. sparsa*, etc. The disease known as *Crustea lactea*, which sometimes covers the faces of children like a mask, is a sort of compound of I. and eczema; and the rose-water lotion already mentioned is a useful application for it. **IM'PETIG'INOUS**, a. *-tĭj'ĭ-nŭs*, of the nature of or relating to.

IMPETRATE, v. *ĭm'pĕ-trāt* [L. *impetrātus*, accomplished, effected: F. *impétrer*]: to obtain by request or entreaty. **IM'PETRATING**, imp. **IM'PETRATED**, pp. **IM'PETRA'TION**, n. *-shŭn*, entreaty or petition of the nature of a demand; the pre-obtaining a church living from the pope, the disposal of which belonged to the king or other patron.

IMPETUOUS, a. *ĭm-pĕt'ū-ŭs* [F. *impétueux*, impetuous—from mid. L. *impetŭōsŭs*—from L. *impĕtus*, violence, force: It. *impetuoso*, impetuous]: rushing with force and violence; moving or acting with force; hasty; violent. **IMPET'UOUSLY**, ad. *-lĭ.* **IMPET'UOUSNESS**, n., or **IMPET'UOS'ITY**, n. *-ŏs'ĭ-tĭ* [F. *impétuosité*]: a rushing with violence or great force; force with fury; vehemence of temper.

Impetus, n. *ĭm'pĕ-tŭs*, violent tendency to any point; violent effort; force or quantity of motion; the force with which a body is driven.—Syn. of 'impetuous': forcible; rapid; furious; precipitate; passionate; boisterous; raging; fierce; vehement.

IMPEYAN, or **Impeyan Pheasant**, *ĭm'pĭ-an fĕz'ănt*, (*Lophophorus Impeyanus*): large gallinaceous bird of family *Phasianidæ*, native of high cold regions of the Himalaya, but remarkable as much as any tropical bird for splendor of plumage, enhanced by the changing metallic tints which it exhibits—green, steel-blue, violet, and golden bronze. The fine plumage belongs to the male alone. The female is clothed in sober brown, mottled with gray and yellow, and is smaller than the male. The I. has been found capable of domestication, and may probably be found capable of naturalization, in Europe and America. It derives its name from Lady Impey, who first attempted to take it alive to Britain, but failed. The Nepaulese name, *Monaul*, signifies *Bird of Gold*.

Impeyan (*Lophophorus Impeyanus*).

IMPIERCEABLE, a. *ĭm-pērs'ă bl* [*im*, not, and *pierceable*]: in *OE.*, that cannot be penetrated or pierced.

IMPIETY, n. *ĭm-pī'ĕ-tĭ* [F. *impiété*—from L. *impĭĕtātem*, impiety—from *im*, not; *pĭŭs*, pious, devout]: any act or expression tending to irreverence toward the Supreme Being or contempt of his laws; want of filial affection or obedience to parents; profaneness; irreligion. **Impious**, a. *ĭm'pĭ-ŭs* [L. *impĭŭs*: F. *impie*]: irreverent toward God; irreligious; profane. **Im'piously**, ad. *-lĭ*. **Im'piousness**, n.—Syn. of 'impiety': ungodliness; unrighteousness; sinfulness; wickedness; irreverence.

IMPINGE, v. *ĭm-pĭnj'* [L. *impin'gĕrĕ*, to drive into, as one thing into another—from *im*, into; *pan'gĕrĕ*, to strike:

It. *impingere*]: to strike or dash against; to clash upon. IMPING'ING, imp. IMPINGED', pp. *-pĭnjd'*. IMPING'ENT, a. *-ĕnt,* falling or striking against.

IMPIOUS, IMPIOUSLY: see under IMPIETY.

IMPISH: see IMP.

IMPLACABLE, a. *ĭm-plā'kă-bl* [F. *implacable*—from L. *implācābĭlĭs,* unappeasable—from *im,* not; *plācābĭlĭs,* placable]: not to be appeased; stubborn or constant in enmity; in *OE.*, not to be relieved or assuaged. IMPLA'CABLY, ad. *-blĭ.* IMPLA'CABIL'ITY, n. *-bĭl'ĭ-tĭ* [F. *implacabilité*]: also IMPLA'CABLENESS, n. *-bl-nĕs,* irreconcilable enmity; unappeasable malice.—SYN. of 'implacable': inexorable; unrelenting; relentless; unappeasable; irreconcilable; malicious.

IMPLACENTATA, n. *ĭm-plă-sĕn-tā'ta,* or IMPLACENTA'TIA, *-shĭ-ā* [prefix *im-;* L. *placenta,* a cake]: in *zool.*, name given by Owen to the subdivision of Mammals not having the placenta developed. It contains the orders *Marsupialia* and *Monotremata.*

IMPLANT, v. *ĭm-plănt'* [F. *implanter,* to implant: L. *im,* into, and Eng. *plant*]: to infuse; to instil; to fix or plant in the mind for the purpose of growth. IMPLANT'ING, imp. IMPLANT'ED, pp. IM'PLANTA'TION, n. *-tā'shŭn* [F.—L.]: the act of implanting or fixing in the mind.—SYN. of 'implant': to insert; infix; place; ingraft; settle; set; sow; inculcate.

IMPLEAD, v. *ĭm-plēd'* [*im,* in or on, and *plead:* F. *plaider,* to plead]: to state the case for the plaintiff; to prosecute or sue at law. IMPLEAD'ING, imp. IMPLEAD'ED, pp. IMPLEAD'ER, n. one who.

IMPLEMENT, v. *ĭm'plĕ-mĕnt'* [mid. L. *implēmen'tum,* that which fills up or completes—from L. *implērĕ,* to fill full—from *im,* in; *plērĕ,* to fill]: in *Scot. law,* to fulfil or perform an engagement, or a decree of the court. IMPLEMENT'AL, a. *-al,* pertaining to or in any way connected with implements; characterized by the use of implements. IM'PLEMENT'ING, im. IM'PLEMENT'ED, pp. IMPLETION, n. *ĭm-plē'shŭn,* the act of filling.

IMPLEMENT, n. *ĭm'plĕ-mĕnt* [F. *employer,* to employ—from mid. L. *implĭcārĕ,* to employ for some one's profit—from L. *im,* into; *plĭcārĕ;* F. *plier,* to fold]: whatever may be used to supply a want; a tool or instrument of labor. AGRICULTURAL IMPLEMENTS, comprehensive term for implements used in the actual cultivation of the soil, and for those requisite for other operations of farming, and for the preparation of the produce of the land for use, so far as preparation is ordinarily carried on by the farmer. The first implements for the cultivation of the ground were doubtless such as could be used by man's unaided strength, and many such are still in use, e.g. the spade, the hoe, the fork, and the shovel. When animals were reduced to the service of man, the plow appeared in its first rude form. Grubbers, cultivators, etc., are recent inventions, rollers are more ancient. Sowing machines or drills are modern, but the harrow is ancient, though branches of trees drawn along the newly sown land, long served the purpose of its now carefully adjusted tines.—The necessity of irrigation in some countries early led to implements for accomplishing it. For the Egyptian *shadoof*, see AGRICULTURE.—Implements for clearing the ground of weeds, for occasional stirring of the ground while under crop, and for *earthing up* crops, all are except the hoe, of comparatively recent invention. The scythe and sickle have been used from remote antiquity, though the reaping-machine is a novelty only beginning to assume a very important place. Wheel-vehicles, carts, wagons, etc., of various descriptions and for various purposes are among agricultural implements; also implements for threshing and winnowing corn, for scutching and breaking flax, for ginning cotton, for crushing sugar-cane and evaporating its juice, etc. Various implements are required in the care of cattle, and for the Dairy (q.v.). See separate titles of implements; also of cultivated plants.

IMPLEX, a. *ĭm'plĕks* [L. *implexus*, plaited—from *im*, into; *plecto*, I plait]: infolded; intricate.

IMPLICATE, v. *ĭm'plĭ-kāt* [L. *implĭcātus*, entwined, involvẹd—from *im*, into; *plĭcō*, I fold]: *literally*, to entwine into; to bring into connection with, as a crime or fault; to involve. IM'PLICATING, imp. IM'PLICATED, pp. IM'PLICA'TION, n. *-kā'shŭn* [F.—L.]: that which is implied but not expressed; something which may fairly be understood, though not expressed in words. IM'PLICATIVE, a. *-kā-tĭv*, having or conveying implication. IM'PLICA'TIVELY, ad. *-lĭ*.

IMPLICIT, a. *ĭm-plĭs'ĭt* [F. *implicit*, implicit, from inference—from L. *implĭc'ĭtŭs*, entwined or interwoven (see IMPLICATE)]: understood, though not expressed in words; trusting to another; relying entirely. IMPLIC'ITLY, ad. *-lĭ*, by inference. IMPLIC'ITNESS, n. the state of trusting without reserve.

IMPLICIT FUNCTION: see EXPLICIT FUNCTION, under EXPLICIT.

IMPLIED: see under IMPLY.

IMPLORE, v. *ĭm-plōr'* [F. *implorer*—from L. *implōrārĕ*, to invoke with tears—from *im*, into; *ploro*, I weep over: It. *implorare*]: *literally*, to invoke with tears; to beg or entreat earnestly; to ask with urgency; to beseech: N. in *OE.*, the act of humble and importunate begging or entreaty. IMPLOR'ING, imp. IMPLORED', pp. *-plōrd'*. IMPLOR'ER, n. *-ėr*, one who. IM'PLORA'TION, n. *-plō-rā'shŭn*, supplication. IMPLOR'INGLY, ad. *-lĭ*, in the manner of entreaty.—SYN. of 'implore': to supplicate; crave; entreat; beg; solicit; ask; request; adjure.

IMPLUVIUM, n. *ĭm-plô'vĭ-ŭm* [L. *implŭvĭŭm*, that which it rains into—from *im*, into; *plŭĭt*, it rains]: tank or basin in the centre of the fore-court or Atrium (q.v.) of an ancient Roman house. In the examples which remain at Pompeii, the I. is generally of marble, and is immediately under the unroofed part of the Atrium, intended to receive the rain which runs down from the roof through the opening. The I. was frequently adorned with fountains, and formed a peculiar and interesting feature in the dwellings of the Romans.

IMPLY, v. *ĭm-plī'* [OF. *implier* and *impliquer*—from L. *implĭcārĕ*, to entwine or involve—from *im*, into; *plĭcō*, I fold—*lit.*, to entwine into]: to involve or comprise in substance or by fair inference, though not expressed in words; to mean; to signify; in *OE.*, to cover; to entangle. IMPLY'ING, imp. IMPLIED', pp. *-plīd'*. ADJ. virtually contained in, though not expressed.—SYN. of 'imply': to involve; comprise; include; import; denote; wrap up; in *OE.* refer; ascribe; attribute.

IMPOISON, v. *ĭm-poy'zn* [*im*, into, and *poison:* F. *empoisonner*, to poison]: to affect with poison; to imbitter. IMPOI'SONING, imp. IMPOI'SONED, pp. *-znd.*

IMPOLICY, n. *ĭm-pŏl'ĭ-sĭ* [*im*, not, and *policy*]: want of policy or wisdom; unsuitableness to the end proposed; imprudence. IMPOL'ITIC, a. *-ĭ-tĭk* [F. *impolitique*, impolitic]: not wise or prudent; not suited to promote the end in view. IMPOL'ITICLY, ad. *-lĭ.*—SYN. of 'impolitic': indiscreet; incautious; imprudent; inexpedient; unwise.

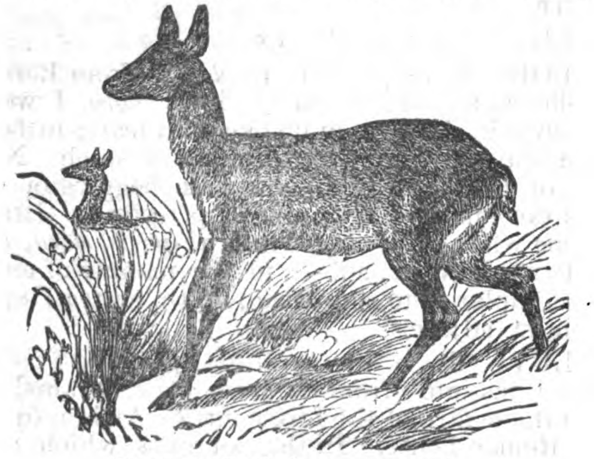
IMPOLITE, a. *ĭm'pō-līt'* [L. *impŏlītŭs*, rude; inelegant; *im*, not, and *polite*]: uncivil; rude in manners. IM'POLITE'LY, ad. *-lĭ.* IM'POLITE'NESS, n. want of manners rudeness.

IMPOLITIC: see under IMPOLICY.

IMPONDERABLE, a. *ĭm-pŏn'dĕr-ă-bl* [F. *impondérable;* It. *imponderabile*, that cannot be weighed—from L. *im*, not or without; *ponděrō*, I weigh]: that cannot be weighed; not having sensible weight. IMPON'DERABIL'ITY, n. *-bĭl'ĭ-tĭ*, the want of sensible weight. IMPON'DERABLES, n. plu. *-ă-blz*, or IMPONDERABLE SUBSTANCES, name given to light, heat, electricity, and magnetism, when they were supposed to be forms of matter but of inappreciable weight: see HEAT.

IMPOOF, or IMPOOFOO: see ELAND.

IMPOON, *ĭm-pôn'* (*Antilope* or *Cephalopus mergens*): spe-



Impoon (*Cephalopus mergens*).

cies of antelope, very plentiful in s. Africa, in wooded districts. It is about 21 inches high at the shoulder, of brownish-yellow color, with white belly. The horns are short and conical, set far back, and inclined backward. It lives solitary, or in pairs. From its habit of plunging among bushes when pursued, standing on its hind legs at intervals to observe its pursuers, and disappearing again, the I. is called *Duyker-bok* (Diver-buck) by the Dutch colonists of s. Africa, among whom its flesh is in great esteem.

IMPOROUS, a. *ĭm-pōr'ŭs* [*im*, not, and *porous*]: free from pores; not spongy; close of texture; very solid. IM'POROS'ITY, n. *-ŏs'ĭ-tĭ*, the absence of pores; compactness.

IMPORT, v. *ĭm-pōrt'* [F. *importer*, to import—from L. *importārĕ*, to bring or carry into--from *im*, into; *porto*, I carry]: to bring or carry into; to bring in from another state or country; to bear or convey by words; to mean; to signify; to be of weight or consequence; in *OE.*, to suggest. IMPORTS', v. in *OE.*, it behooves; it interests or concerns any one. IMPORT'ING, imp. bringing into, as goods; bearing, as a meaning. IMPORT'ED, pp. ADJ. brought into a country, applied generally to all goods and merchandise brought by sea. IMPORT, n. *ĭm'pōrt*, that which is brought into a country; that which is conveyed by words; meaning; tendency; bearing; in *OE.*, importance. IMPORT'ER, n. one who receives goods and produce directly from abroad. IMPORT'ABLE, a. *-ă-bl*, that may be imported. IM'PORTA'TION, n. *-tā'shŭn* [F.—L.]: the act or practice of bringing from another state or country; the articles brought from another country; conveyance and delivery. IMPORT'ANT, a. *-pawrt-ănt* [F.—L.]: of great consequence; weighty. IMPORT'ANTLY, ad. *-lĭ*. IMPORT'ANCE, n. *-ăns* [F.—L.]: weight; consequence. IMPORT'ANCY, n. *-ăn-sĭ*, *OE.* for IMPORTANCE. IMPORT'LESS, a. *-lĕs*, in *OE.*, of no moment or consequence. IMPORTS AND EXPORTS, constituting the foreign trade of a country: see below: also BALANCE OF TRADE. *Note.*--IMPORT, as a commercial term, may have its root in *portus*, a harbor, rather than in *porto*, I bring, I carry.—SYN. of 'import v.': to include; denote; imply; concern; interest; introduce; bring in; carry in;—of 'import n.'; merchandise; purport; sense; tenor; drift; signification; scope; intention; weight; consequence;—of 'important': momentous; weighty; forcible; significant; efficacious; in *OE.*, importunate.

IMPORTABLE, a. *ĭm-pōrt'ă-bl* [OF. *importable*, intolerable—from mid. L. *importābĭlĭs*, that cannot be borne—from L. *im*, not; *porto*, I carry]: in *OE.*, intolerable; that cannot be borne.

IMPORTS AND EXPORTS: Foreign trade of a country. In consulting the following tables of the Imports and Exports of the United States, it is to be remembered (1) that prior to 1821 there was no separation of merchandise from specie in the official reports of the treas. dept., (2) that prior to 1843 the fiscal year ended Sep. 30, (3) that since 1843 the fiscal year has ended June 30, and (4) that the reports for 1843 cover nine months' time only, because of the change.

VALUE IN SPECIE OF IMPORTS AND EXPORTS OF THE UNITED STATES, 1789, SEP. 30—1889, JUNE 30.

Fiscal Year.	Imports.			Foreign Exports.		
	Merchandise.	Coin and Bullion.	Total.	Merchandise.	Coin and Bullion.	Total.
1790			$23,000,000			$539,156
1791			29,200,000			512,041
1792			31,500,000			1,753,098
1793			31,100,000			2,109,572
1794			34,600,000			6,526,233
1795			69,756,268			8.489,472
1796			81,436,164			26,300,000
1797			75,379,406			27,000,000
1798			68,551,700			33,000,000
1799			79,069,148			45,523,000
1800			91,252,768			39,130,877
1801			111,363,511			46,642,721
1802			76,333,333			35,774,971
1803			64,666,666			13,594,072
1804			85,000,000			36,231,597

IMPORTS AND EXPORTS.

1805			120,600,000			53,179,019
1806			129.410,000			60,283,236
1807			138,500,000			59.643,558
1808			56,990,000			12,997,414
1809			59,400,000			20,797,531
1810			85,400,000			24,391,295
1811			53,400,000			16,022,790
1812			77,030,000			8,495,127
1813			22,005,000			2,847,845
1814			12.965,000			145,169
1815			113,041,274			6,583,350
1816			147,103,000			17,138,556
1817			99,250.000			19,358,069
1818			121,750,000			19,426,696
1819			87,125.000			19,165,683
1820			74,450,000			18,008,029
1821	$54,520,835	$8,064.890	63,585,724	$10,824,429	$10,478,059	21,302,488
1822	79,871,695	3,369,846	83,241,541	11,476,022	10,810,180	22,286,202
1823	72,481,371	5,097,896	77,579,267	21,170,635	6,372,987	27,543,622
1824	72,170,037	8,378,970	80.549,007	18,322,605	7,014,552	25,337,157
1825	90,189,310	6,150,765	96,340,075	23,793,588	8,797,055	32,590,643
1826	78,093,511	6,880,966	84,974.477	20,440,934	4,098,678	24,539,612
1827	71,332,938	8,151,130	79.484.068	16,431,830	6,971,306	23,403,136
1828	81,020,083	7,489,741	88,509,824	14,044,578	7,550,439	21,595,017
1829	67,088,915	7,403,612	74,492,527	12,347,344	4,311,134	16,658,478
1830	62,720,956	8,155,964	70,876.920	13,145,857	1,241,622	14,387,479
1831	95,885,179	7,305,945	103,191.124	13,077,069	6,956,457	20,033,526
1832	95,121,762	5,907,504	101.029,266	19,794,074	4,245,399	24,039,473
1833	101,047,943	7,070,368	108,118.311	17,577,876	2,244,859	19,822,735
1834	108,609,700	17,911,632	126,521,332	21,636,553	1,676,258	23,312,811
1835	136,764,295	13,131,447	149.895,742	14,756,321	5.748.174	20,504,495
1836	176,579.154	13,400,881	189,980,035	17,767,762	3,978,598	21,746,360
1837	130.472,808	10,516,414	140,989,217	17,162,232	4,692,730	21,854,962
1838	95.970.288	17,747,116	113,717,404	9,417,690	3,035,105	12,452,795
1839	156,496,956	5,595,176	162,092,132	10,626,140	6,868,385	17,494,525

VALUE IN SPECIE OF IMPORTS AND EXPORTS OF THE UNITED STATES—*Continued.*

FISCAL YEAR.	IMPORTS.			FOREIGN EXPORTS.		
	Merchandise.	Coin and Bullion.	Total.	Merchandise.	Coin and Bullion.	Total.
1840	98,258,706	8,882,813	107,141,519	12,008,371	6,181,941	18,190,312
1841	122,957,544	4,988,633	127,946,177	8,181,235	7,287,846	15,469,081
1842	96,075,071	4,087,016	100,162,087	8,078,753	3,642,785	11,721,538
1843	42,433,464	22,320,335	64,753,799	5,139,335	1,413,362	6,552,697
1844	102,604,606	5,830,429	108,435,035	6,214,058	5,270,809	11,484,867
1845	113,184,322	4,070,242	117,254,564	7,584,781	7,762,049	15,346,830
1846	117,914,065	3,777,732	121,691,797	7,865,206	3,481,417	11,346.623
1847	122,424,349	24,121,289	146,545,638	6,166,754	1,844,404	8,011,158
1848	148,638,644	6,360,284	154,998,928	7,986,806	13,141,204	21,128,010
1849	141,206,199	6,651,240	147,857,439	8,641,091	4,447,774	13,088,865
1850	173,509,526	4,628,792	178,138,318	9,475,493	5,476,315	14,951,808
1851	210,771,429	5,453,503	216,224,932	10,295,121	11,403,172	21,698,293
1852	207,440,398	5,505,044	212,945,442	12,053,084	5,236,298	17,289,382
1853	263,777,265	4,201,382	267,978,647	13,620,120	3,038,340	17,558,460
1854	297,623,039	6,939,342	304,562,381	21,631,260	3,218,934	24.850,194
1855	257,808,708	3,659.812	261.468,520	26,158,368	2,289,925	28,448,293
1856	310,432,310	4,207,632	314,639,942	14,781,372	1,597,206	16,378,578
1857	348,428,342	12,461,799	360,890,141	14,917,047	9,058,570	23,975,617
1858	263,338,654	19,274,496	282,613,150	20,660,241	10,225,901	30,886,142
1859	331,333,341	7,434,789	338,768,130	14,509,971	6,385,106	20,895.077
1860	353,616,119	8,550,135	362,166,254	17,333,634	9,599,388	26.933,022
1861	289,310,542	46,339,611	335,650,153	14,654,217	5,991,210	20,645,427
1862	189,356,677	16,415,052	205,771,729	11,026,477	5,842,989	16,869,466
1863	243,335,815	9,584,105	252,919,920	17,960,535	8,163,049	16,123,584

1864	316,447,283	13.115,612	329,562,895	15,333.961	4,922,979	20,256,940
1865	238,745,580	9,810,072	248,555,652	29,089,055	3,025,102	32,114,157
1866	434,812,066	10,700,092	445,512,158	11,341,420	3,400,697	14,742,117
1867	395,763,100	22,07[illegible],475	417,833.575	14,719,332	5,892,176	20,611,508
1868	357,436,440	14,188,368	371,624,808	12,562,999	10,038,127	22,601,126
1869	417,506,379	19,807,876	437,314,255	10,951,000	14.222,414	25,173,414
1870	435,958,408	26,419,179	462,377,587	16,155,295	14,271,864	30,427,159
1871	520,223,684	21,270,024	541,493,708	14,421,270	14,038,629	28,459,899
1872	626,595,077	13,743,689	640,338,766	15,690,455	7,079,294	22,769,749
1873	642,136,210	21,480,937	663,617,147	17,446,483	10,703,028	28,149,511
1874	567,406,342	28,454,906	595,861,248	16,849,619	6,930,719	23,780,338
1875	533,005,436	20,900,717	553,906,153	14,158,611	8,275,013	22,433,624
1876	460,741,190	15,936,681	476,677,871	14,802,424	6,467,611	21,270,035
1877	451,323,126	40,774,414	492,097,540	12,804,996	13,027,499	25,832,495
1878	437,051,532	29,821,314	466,872,846	14,154,698	6,678,240	20,832,938
1879	445,777,775	20,296,000	466,075,775	12,098,651	7,442,406	19,541,057
1880	667,954,746	93,034,310	760,989,056	11,692,305	7,795,026	19,487,331
1881	642,664,628	110,575,497	753,240,125	18,451,399	5,179,903	23,681,902
1882	724,639,574	42,472,390	767,111,964	17,302,525	5,937,208	23,239,733
1883	723,180,914	28,489,391	751,670,305	19,615,770	10,197,152	29,812,922
1884	667,697,693	37,426,262	705,123,955	15,548,757	16,907,748	32,456,505
1885	577,527,329	43,242,323	620,769,652	15,506,809	17,885,415	33,362,224
1886	635,436,136	38,593,656	674,029,792	13,560,301	20,539,293	34,099,594
1887	692,319,768	60,170,792	752,490,560	13,160,288	13,287,351	26,447,639
1888	723,957,114	59,337,986	783,295,100	12,092,403	13,218,679	25,311,082
1889	745,127,476			12,119,193		

COMBINED VALUE OF IMPORTS AND EXPORTS OF MERCHANDISE AND SPECIE AT SPECIE RATES, 1860–1889.

FISCAL YEAR.	EXPORTS.		Total exports.	Imports.	Total imports and exports.	Excess of exports over imports.	Excess of imports over exports.
	Domestic.	Foreign.					
1860	$373,189,274	$26,933,022	$400,122,296	$362,166,254	$762,288,550	$37,956,042	
1861	228,699,486	20,645,427	249,344,913	335,650,153	584,995,006		$86,305,240
1862	210,688,675	16,869,466	227,558,141	205,771,729	433,329,870	21,786,412	
1863	241,997,474	26,123,584	268,121,058	252,919,920	521,040,978	15,201,138	
1864	243,977,589	20,256,940	264,234,529	329,562,895	593,797,424		65,328,366
1865	201,558,372	32,114,157	233,672,529	248,555,652	482,228,181		14,883,123
1866	420,161,476	14,742,117	434,903,593	445,512,158	880,415,751		10,608,565
1867	334,763,005	20,611,508	355,374,513	417,831,571	773,206,084		62,457,058
1868	353,135,875	22,601,126	375,737,001	371,624,808	747,361,809	4,112,193	
1869	318,082,663	25,173,414	343,256,077	437,314,255	780,570,332		94,058,178
1870	420,500,275	30,427,159	450,927,434	462,377,587	913,305,021		11,450,153
1871	512,802,267	28,459,899	541,262,166	541,493,708	1,082,755,874		231,542
1872	501,285,371	22,769,749	524,055,120	640,338,766	1,164,393,886		116,283,640
1873	578,938,985	28,149,511	607,088,496	663,617,147	1,270,705,643		56,528,651
1874	629,133,107	23,780,338	652,913,445	595,861,248	1,248,774,693	57,052,197	
1875	583,141,229	22,433,624	605,574,853	553,906,153	1,159,481,006	51,668,700	
1876	575,620,938	21,270,035	596,890,973	476,677,871	1,073,568,844	120,213,102	
1877	632,804,962	25,832,495	658,637,457	492,097,540	1,150,734,997	166,539,917	
1878	707,771,153	20,834,738	728,605,891	466,872,846	1,195,478,737	261,733,045	
1879	715,895,825	19,541,057	735,436,882	466,073,775	1,201,510,657	269,363,107	
1880	833,294,246	19,487,331	852,781,577	760,989,056	1,613,770,633	91,792,521	
1881	898,152,891	23,631,302	921,784,193	753,240,125	1,675,024,318	168,544,068	
1882	776,720,003	23,239,733	799,959,736	767,111,964	1,567,071,700	32,847,772	
1883	825,846,813	29,812,922	855,659,735	751,670,305	1,607,330,040	103,989,430	
1884	775,190,487	32,456,505	807,646,992	705,123,955	1,512,770,947	102,523,037	
1885	751,059,056	33,362,224	784,421,280	620,769,652	1,405,190,932	163,651,628	
1886	717,888,646	34,099,594	751,988,240	674,029,792	1,426,018,032	77,958,448	
1887	725,733,263	26,447,639	752,180,902	752,490,560	1,504,671,462		309,658
1888	717,057,608	25,311,082	742,368,690	783,295,100	1,525,663,790		40,926,410
1889	730,282,606	12,119,193	742,401,799	745,127,476	1,487,529,275		2,725,677

IMPORTS AND EXPORTS.

The increase in the exports of merchandise (1889), was mainly in cotton, raw; provisions; animals; wood and manufactures of; mineral oils; iron and steel and manufactures of; and seeds, in their order. There was a decrease in the export of breadstuffs, tobacco, and manufactures of cotton. The increase in imports was in coffee; wool and manufactures of; wool, raw; hides and skins; seeds; hemp; and silver ore. There was a decrease in the import of iron and steel and manufactures of; vegetables; and manufactures of cotton. The value of imports of merchandise 1889, was the largest in the history of our commerce $745,127,476, the nearest approach being 1882, when it reached $724,639,574.

Official reports 1889 being incomplete at time of writing, the movement of American imports and exports, excluding gold and silver, is indicated by that of the fiscal year 1888:

IMPORTS AND EXPORTS OF THE UNITED STATES BY COUNTRIES, 1888.

COUNTRIES.	EXPORTS.		Imports.
	Domestic.	Foreign.	
Argentine Republic..	$6,099,411	$544,142	$5,902,159
Australasia, Brit....	11,076,053	92,626	5,027,779
Austria..............	331,662	1,164	8,683,528
Belgium	24,636,205	544,517	9,836,572
Brazil...............	7,063,892	73,116	53,710,234
British E. Indies.....	3,745,695	17	18,406,293
British W. Indies....	7,450,018	161,515	12,550,940
Canada	33,073,866	2,808,517	42,924,554
Central America....	4,131.574	134,012	7,623.378
Chili	2,423,303	9,918	2,894.520
China	4,581,083	1,502	16,690,589
Columbia, U. S. of...	4,923,259	100,621	4,393,258
Cuba	9,724,124	329,436	49,319.087
Danish W. Indies...	603,140	8,999	399,220
Denmark............	3,002,463	11,700	497,874
Dutch E. Indies......	2,359,803	598	3,306,626
England............	308,392,972	2.990,131	150,263,236
France	37,784,237	1,426,071	71,365,266
French W. Indies....	1,574,728	29,099	116,890
Germany	55,621,264	792,907	78,421,835
Greece..............	174,411	....	1,262,519
Hawaiian Islands....	3,025,808	59.305	11,060,379
Hayti	4,322,653	294,472	2,918.820
Hong Kong..........	3,345,477	6,475	1,445,774
Ireland	19,005,735	11,816	9,320,374
Italy.................	12,725,887	25,672	18,401,588
Japan	4,208,121	6,261	18,621,576
Mexico	9,242,188	655,584	17.329,889
Netherlands	15,983,191	230,942	12,356,374
Peru.................	863,160	5,011	309,040
Porto Rico..........	1,920,358	49,260	4,412,483
Portugal.............	4,910,197	2,087	1,463,942
Russia...............	11,357,435	2,223	3,597,729
San Domingo	792,560	25,147	1,459,392
Scotland	30,840.083	274,966	18,314,363
Spain................	14,310.459	7,707	5,189,745
Sweden—Norway....	2,679.613	41,009	3,256,064
Switzerland.	24,254	330	13,711,286
Uruguay.............	1,337,430	121,902	2,711,521
Venezuela	3,008,336	30,179	10,051,250

IMPORTS AND EXPORTS.

During 1888 the imports of duty-free goods amounted in value to $244,068,327, against $234,221,131 in 1887; and the total imports of goods entered for consumption in the United States amounted to $712,248,626. Of the totals of merchandise ($723,957,114) and coin and bullion ($59,337,986) imported 1888, American vessels brought $123,525,298, foreign vessels $568,222,357, and land vehicles $32,209,459. The specie imports (1888) were: gold bars and bullion $17,180,332; American coin $5,181,513; foreign coin $21,572,472; total gold $43,934,317; silver bars and bullion $5,619,006; American coin $306,579; foreign coin $9,478,084; total silver $15,403,669; total gold and silver $59,337,986. Of the totals of gross exports, merchandise, and specie, 1888 (742,368,690), American vessels carried $84,485,812, foreign vessels $635,460,809, and land vehicles $22,422,069.

Imports and Exports of Foreign Nations.—The following table shows the totals of imports and exports of merchandise, specie, and bullion of the leading foreign nations, compiled from the latest reports at the time of writing.

COUNTRIES.	Year.	Imports.	Exports.
Argentine Republic......	1887	$121,123,120	$89,418,641
Australasia..............	1887	286,274,840	252,764,920
Austria, Hungary........	1888	265,332,240	332,560,289
Belgium.............. ...	1888	258,650,000	228,841,340
Bolivia..................	1888	5,950,000	10,115,845
Brazil...................	1885	103,691,240	125,143,260
Canada....	1888	110,894,630	90,203,000
Chili	1888	40,170,168	46,740,268
China	1886	122,153,500	103,033,640
Columbia, U. S. of... ...	1887	13,520,346	7,968,000
Denmark................	1887	45,781,508	45,318,504
Ecuador.................	1887	11,106,340	10,103,645
Egypt....................	1888	40,685,000	54,380,000
France..................	1888	878,260,941	720,137,640
Germany................	1888	797,251,640	798,364,287
Great Britain............	1888	1,811,137,820	1,403,815,805
Greece	1888	25,471,640	19,831,440
Hawaii....	1887	4,053,355	4,944,000
India, British............	1887	364,153,350	450,953,165
Italy....................	1887	327,640,890	214,940,320
Japan	1888	51,699,769	52,409,223
Mexico..................	1887	38,715,000	49,197,000
Netherlands............	1887	453,627,340	361,982,615
Norway...	1887	36,096,570	28,789,560
Paraguay...............	1887	2,361,480	1,938,940
Persia..................	1886	26,742,000	15,601,000
Peru.	1887	10,563,448	7,458,328
Portugal.................	1888	46,789,000	21,249,000
Roumania	1886	59,640,000	51,148,000
Russia..................	1887	308,496,528	354,194,110
Servia..................	1888	8,218,885	8,125,815
Siam....................	1886	6,200,000	11,200,000
Spain..........	1886	165,390,680	121,389,465
Sweden	1887	81,368,820	61,667,460
Switzerland.............	1888	161,827,750	130,118,640
Turkey	1887	91,094,272	55,912,120
United States............	1888	783,295,100	742,368,690
Uruguay	1877	20,200,000	23,800,000
Venezuela......	1887	12,074,320	15,912,162
Total.		$7,997,703,530	$7,124,040,137

Excess of imports over exports, $873,663,393

IMPORTUNE, v. *ĭm'pŏr-tūn'* [F. *importuner*, to importune; *importun*, importunate—from L. *importūnŭs*, inconvenient, troublesome—from *im*, not or without; *portus*, a harbor: It. *importunare*]: to press or tease again and again with the same request; to urge with unceasing application. **Im'portu'ning**, imp. **Im'portuned'**, pp. *-tūnd'*. **Im'portu'ner**, n. *-nėr*, one who. **Im'portu'nity**, n. *-tū'nĭ-tĭ* [F. *importunité*]: pressing or incessant application for a claim or favor. **Importunate**, a. *ĭm-pŏr'tū-nāt* [mid. L. *importūnātŭs*, pressingly urged]: pressingly urgent; not easily repulsed; incessant in solicitations. **Impor'tunately**, ad. *-lĭ*. **Impor'tunateness**, n. urgent or pressing solicitation. **Impor'tunacy**, n. *-tū-nă-sĭ*, in *OE.*, the act of importuning.—Syn. of 'importune': to tease; request; press; harass; molest; disturb; annoy; solicit.

IMPORTUNE, a. *ĭm-pŏr'tūn* [see **Importune** 1]: in *OE.*, recurring constantly; troublesome by urgency; vexatious; unreasonable; happening at a wrong time; inexorable; cruel.

IMPOSE, v. *ĭm-pōz'* [F. *imposer*—from *im*, on, upon; *poser*, to place—from mid. L. *pausārĕ*, to place—from L. *pōnĕrĕ*: L. *impŏsĭtŭs*, placed or laid on—from *im*, in or on; *pōnĕrĕ*, to place]: to lay or place on, as a burden or duty; to enjoin: N. in *OE.*, command; injunction. **Impo'sing**, imp.: Adj. commanding; suited to impress forcibly. **Impo'singly**, ad. *-lĭ*. **Imposed'**, pp. *-pōzd'*. **Impo'ser**, n. *-zėr*, one who impresses or lays on. **Impo'sable**, a. *-ză-bl*, that may be imposed or laid on. **Imposition**, n. *ĭm'pō-zĭsh'ŭn* [F.—L.]: the act of laying on; injunction of anything as a law or duty; imposture; fraud; a tax or toll; oppression; an extra exercise laid on a student as a punishment. **Impo'sing**, n. among *printers*, the placing of pages of type upon a stone table, called an *imposing-stone*, and securing them firmly in an iron frame or chase, in order to their being printed from. **Impost**, n. *ĭm'pōst*, a tax; a burden; the top part of a pillar which supports an arch (see below). **To impose on**, to deceive; to mislead by a false pretense. **Imposition of hands**, in *eccles.*, the confirmation or ordination of persons by the bishop laying his hands on them; ordination; confirmation.—Syn. of 'imposition': deception; deceit; trick; charge; burden; injunction; levy; tax; toll; exaction; delusion; cheating; imposture;—of 'impost': tribute; toll; excise; custom; duty.

IMPOSSIBLE, a. *ĭm-pŏs'sĭ-bl* [F. *impossible*—from L. *impossĭb'ilis;* It. *impossibile*, impossible—from *im*, not, and Eng. *possible*]: that cannot be done; impracticable. **Impos'sibil'ity**, n. *-bĭl'ĭ-tĭ* [F. *impossibilité*]: that which cannot be done; state of being not feasible.

IMPOST: see under **Impose**.

IM'POST: point where an arch rests on a wall or column. It is usually marked by horizontal moldings, but sometimes these are absent, especially in Gothic architecture, where different forms of I. are used. These have been classed by Prof. Willis as—1st, 'the *continuous* I,' where the arch moldings are carried down the pier; 2d, 'the *discontinuous* I.,' where the arch moldings abut and are stopped on the pier; 3d, 'the *shafted* I.,' where the arch moldings spring from a capital, and are different from those of the pier—the form used in the best Gothic; 4th, 'the *banded* I.,' where the pier and arch have the same moldings; but the I. is marked by a band of horizontal moldings, as is frequently the case in Italian-Gothic buildings. These simple forms are sometimes used together, to produce more complex combinations.

IMPOSTHUME, n. *ĭm-pŏs'tūm:* the common but incorrect spelling of APOSTEME, what separates or stands apart; an abscess: see APOSTEME.

IMPOSTURE, n. *ĭm-pŏs'tūr* [F. *imposture;* It. *impostura,* imposture, cheat—from mid. L. *impostūră*—from L. *impŏsĭtus,* placed or laid on]: deception; fraud. IMPOS'TOR, n. *-tėr,* one who assumes a character in order to deceive; a cheat.—SYN. of 'impostor': deceiver; rogue; pretender;—of 'imposture': cheat; trick; imposition; delusion.

IMPOTENT, a. *ĭm'pŏ-tĕnt* [F. *impotent*—from L. *impŏten'tem,* powerless—from *im,* not; *pŏtens,* powerful; It. *impotente*]: weak; feeble; wanting strength or power; having no power of sexual intercourse. IM'POTENTLY, ad. *-lĭ.* IM'POTENCE, n. *-tĕns* [F.—L.], also IM'POTENCY, n. *-tĕn-sĭ,* want of strength or power; weakness; imbecility; incapacity of propagation: in law it is a ground for either of two married parties annulling the marriage, if the impotency can be proved to have existed when the contract was entered into.

IMPOUND, v. *ĭm-pŏwnd'* [*im,* into, and *pound*]: to shut up in a pound or pen; to confine; to shut in; to retain in keeping of the court, instead of returning to the owner, a document which has been produced in a case—in order to enable a prosecution to be brought if necessary. IMPOUND'ING, imp. IMPOUND'ED, pp. IMPOUND'ER, n. one who. IMPOUND'AGE, n. *-āj,* the act of impounding or confining cattle. Impounding is the remedy given to all occupiers of land against the cattle of strangers which stray on such land. It amounts, in fact, to taking and keeping the cattle as security for the damage which they have done. The occupier is then said to distrain the cattle *damage feasant.* This he does by seizing and driving them to the nearest pound—i.e., an inclosed place kept for the purpose—or he may put them in premises of his own. In either case, he is bound to feed and water the cattle at the expense of the owner of such stray cattle, who can recover them only by paying these expenses and the damage done, or on giving security, and bringing an action of Replevin (q.v.) to try the right. The cattle cannot be distrained unless they are at the time actually trespassing upon the land. The details of the law vary in different localities.—In Scotland, a similar right is called the *poinding* of stray cattle.

IMPOVERISH, v. *ĭm-pŏv'ėr-ĭsh* [corrupted from OF. *appovrissant*, impoverishing, beggaring—from L. *im*, into, or AS. *em* for *en*, to make; L. *pauper;* F. *pauvre;* OF. *povre*, poor]: to reduce to poverty; to make poor; to exhaust, as resources, or the fertility of land. IMPOV'ERISHING, imp. IMPOV'ERISHED, pp. *-ĭsht*. IMPOV'ERISHER, n. *-ėr*, one who. IMPOV'ERISHMENT, n. the act of reducing to poverty; exhaustion.

IMPRACTICABLE, a. *ĭm-prăk'tĭ-kă-bl* [F. *impracticable: im*, not, and *practicable*]: that cannot be done or performed; not to be done by human means; that cannot be easily dealt with; unmanageable; that cannot be used. IMPRAC'TICABLY, ad. *-kă-blĭ*. IMPRAC'TICABIL'ITY, n. *-bĭl'ĭ-tĭ*, or IMPRAC'TICABLENESS, n. *-kă-bl-nĕs*, state or quality of being beyond the power of man, or the means proposed.

IMPRECATE, v. *ĭm'prĕ-kāt* [L. *imprĕcātŭs*, invoked—from *im*, in or on; *prĕcor*, I pray: It. *imprecare*]: to call for evil upon one's self or others; to invoke, as an evil on any one; to pray that a curse or calamity may fall upon. IM'PRECATING, imp. IM'PRECATED, pp. IM'PRECA'TION, n. *-kā'shŭn* [F.—L.]: the act of imprecating; a curse; a prayer that a calamity may fall on some one. IM'PRECA'TORY, a. *-kā'tėr-ĭ*, containing a prayer for evil.—SYN. of 'imprecation': execration; malediction; anathema.

IMPREGN, v. *ĭm-prēn'* [F. *imprégner*, to impregnate: OF. *pregner*, to take (see IMPREGNATE)]: in *OE.*, to impregnate; to make prolific. IMPREGN'ING, imp. IMPREGNED', pp. *-prēnd'*.

IMPREGNABLE, a. *ĭm-prĕg'nă-bl* [F. *imprenable*, impregnable—from L. *im*, not; OF. *pregner;* L. *prehen'dĕrĕ*, to take]: that cannot be reduced or taken by force; not to be moved or shaken. IMPREG'NABLY, ad. *-blĭ*. IMPREG'NABIL'ITY, n. *-bĭl'ĭ-tĭ*, state of being impregnable.—SYN. of 'impregnable': unshaken; unmoved; unaffected; invincible.

IMPREGNATE, v. *ĭm-prĕg'nāt* [mid. L. *imprægnātus*, impregnated: It. *impregnare*, to get with young; *impregnatura*, the state of being with young—from L. *im*, in; *prægnans*, with child: F. *imprégner*, to impregnate]: to render or make prolific; to cause to conceive; to saturate; to infuse the qualities or virtues of one thing into another. IMPREG'NATING, imp. IMPREG'NATED, pp. made pregnant or prolific. IM'PREGNA'TION, n. *-nā'shŭn*, act of impregnating; that with which anything is impregnated.

IMPRESA, a. *ĭm-prā'sa* [It.]: in *her.*, a device, a motto, as on a shield, etc.; an impress.

IMPRESARIO, n. *ĭm'prĕs-ā'rĭ-ō* [It.]: one who undertakes any public or private business; the organizer of an opera company.

IMPRESCRIPTIBLE, a. *ĭm'prĕ-skrĭp'tĭ-bl* [L. *im*, not, and *prescriptible*]: that cannot be lost or impaired by neglect or want of use. IM'PRESCRIP'TIBLY, ad. *-blĭ*.

IMPRESE, n. *ĭm-prēs'* [It. *impresa*, an enterprise, an emblem]: in *OE.*, an emblem; a device.

IMPRESS, v. *ĭm-prĕs'* [OF. *impresser*, to impress—from mid. L. *impressārĕ*, to impress: L. *impressus*, formed or made by pressing—from *im*, in or on; *pressus*, pressed or squeezed: It. *impresso*, stamped, impressed]: to make a mark or figure by pressing; to stamp; to indent; to fix deep, as in the mind; to seize or employ for the public service: N. *ĭm'prĕs*, a mark or figure made by pressing; a stamp; the image or figure of anything, as if formed by pressure; effects produced on character, events, etc.; in *OE.*, the act of forcing into any service; compulsion. IMPRES'SING, imp. IMPRESSED', pp. *-prĕst'*. IMPRES'SION, n. *-prĕsh'ŭn* [F.—L.]: the act of impressing; perceptible effects; a mark; a copy; effects produced by external causes on the mind: idea; indistinct recollection; the total number printed at one time, as of a book; a single edition; a print from an engraved plate. IMPRES'SIONABLE, a. *-ă-bl*, liable or subject to impressions; susceptible of impressions. IMPRES'SIBLE, a. *-sĭ-bl*, that readily receives impressions. IMPRES'SIBLY, ad. *-sĭ-blĭ*. IMPRES'SIBIL'ITY, n. *-bĭl'ĭ-tĭ*, quality of being impressible. IMPRES'SIVE, a. *-sĭv*, adapted to excite solemn attention and feeling. IMPRES'SIVELY, ad. *-lĭ*. IMPRES'SIVENESS, n. *-sĭv-nĕs*, the quality of being impressive. IMPRESS'MENT, n. *-mĕnt*, act of seizing men for the public service; system of enforced service in the navy, formerly much resorted to (see below). IMPRESSURE, n. *ĭm-prĕsh'ūr*, in *OE.*, a mark made by pressure; a dint. IMPRESS-GANG, a party of men formerly employed forcibly to seize men as seamen for ships of war—usually written PRESS-GANG. PROOF-IMPRESSION, an early copy taken from an engraved plate, a lithographic stone, and the like. —SYN. of 'impress, v.': to imprint; press; stamp; mark; indent; inculcate;—of 'impression': indentation; print; result; influence; operation; edition.

IMPRESSIONISTS, in Art: class of painters who strive to reproduce on canvas the impression that nature makes on them. Impressionism differs from realism in that it attempts to go deeper; and beside showing a glimpse of nature as it really appears to the eye seeks to convey an idea of the effect that the particular piece of landscape or marine view exerts on the mind. The new school originated in London. It has drawn the severest criticisms of veteran painters; but has gained a degree of popularity, and seems likely to exert at least some modifying force in art.

IMPRESS'MENT: formerly the mode of manning the British navy. The practice had the force of law; for many acts of parliament, from the reign of Philip and Mary to that of George III., had been passed to regulate the system of impressment. I. consisted in seizing by force, for service in the royal navy, seamen, river-watermen, and at times landsmen, when state emergencies rendered such procedure necessary. An armed party commanded by officers, usually proceeded to such houses in the seaport towns as were supposed to be the resort of the seafaring population, laid violent hands on all eligible men, and conveyed them forcibly to the ships of war in the harbor. As it was not in the nature of sailors to yield without a struggle, many terrible fights took place between the press-gangs and their intended victims—combats in which lives were often lost. Nothing can justly be said in favor of I.; it had not even the merit of an impartial selection from the whole available population.

In recent times, when volunteers fail, a system of Bounties (q.v.) has been resorted to; and it is not probable that recourse will be again had to I., though in Britain the laws sanctioning it only slumber, without being repealed. It is not known under the U. S. laws. See ENLIST (ENLISTMENT).

Under the British laws, all eligible men of seafaring habits are liable between the ages of 18 and 55; though some exemptions are made. A press-gang could board a merchant-vessel or a privateer of its own nation in any part of the world, and carry off as many of the best men as could be removed without actually endangering the vessel. The exercise of this power made a privateer dread a friendly man-of-war more than an enemy, and often led to as exciting a chase as when enemies were in pursuit; for the privateer's men were the best sailors, for their purpose, that the naval officers could lay hold on.

IMPREST, n. *ĭm'prĕst* [It. *in presto,* in readiness, in hand]: in *OE.*, money given out for a certain purpose to be afterward accounted for; earnest-money; money advanced. IN PREST, in ready money.

IMPRIMATUR, n. *ĭm'prĭ-mā'tėr* [L. let it be printed—from *imprĭmō,* I mark or stamp]: the license to print a book which is printed on the title-page; authority.

IMPRIMIS, ad. *ĭm-prī'mĭs* [L. *imprīmis*—from *im,* in; *prīmŭs,* first]: in the first place.

IMPRINT, n. *ĭm'prĭnt* [*im,* in or on, and *print*]: the place where, the person by whom, and the time when a book is published, printed at the bottom of the title—sometimes at the end, as in newspapers: V. *ĭm-prĭnt',* to mark by pressure; to stamp; to fix on the mind or memory. IMPRINT'ING, imp. IMPRINT'ED, pp.—SYN of 'imprint, v.': to impress; indent; mark; print; fix.

IMPRISON, v. *ĭm-prĭz'n* [*im,* in or on, and *prison:* F. *emprisonner,* to confine]: to put into or to confine in a prison; to shut up or confine; to restrain. IMPRIS'ONING, imp. IMPRIS'ONED, pp. *-prĭz'nd.* IMPRIS'ONMENT, n. *-n-mĕnt,* the act of putting into prison; confinement in a place; restraint of liberty.—SYN. of 'imprison': to immure; confine; incarcerate;—of 'imprisonment': incarceration; confinement; durance; custody; captivity; bondage.

IMPRIS'ONMENT: actual confinement, forcible restraint, or detention of a person against his will, as a criminal punishment or civil remedy. The power to imprison is either (1) inherent in courts or magistrates, or (2) conferred upon them by statutes. In civil procedure

I. is inflicted usually for debt or actions growing out of money or other property transactions where an intent to deceive or defraud is alleged. I. for debt is now generally abolished; but in Great Britain and the United States a person refusing to obey an order from competent authority to pay a debt may be imprisoned—not because of the debt—but for contempt of the court or other authority; and an alleged debtor may be imprisoned before judgment has been obtained if it can be shown that he is about to leave the kingdom (Gt. Brit.) or the state (U. S.). In N. Y. the law establishing the national guard provides that any member of the state militia may be imprisoned in default of the payment of his annual dues till they are paid. (See Kent's *Commentaries*, II. 398-9 for a comprehensive summary of the statutes of the various states in the union on I. on mesne or final process in cases of proceedings of creditors against a debtor.) In criminal proceedings I. is resorted to for the detention of persons against whom serious offenses have been alleged till an examination can be had; to secure the appearance of principals, and such witnesses as may be deemed likely to remove from the jurisdiction of the authority having the case before it, at the time of trial; and for the punishment of those convicted of criminal offenses. The length of I. is determined by local state statutes according to the grade of the offense, and differs widely in various states even for identical grades. National convicts, comprising representatives of the army, navy, or other branch of the public service, may be imprisoned in any of the milit. prisons, or in state penitentiaries, the govt. paying the cost of their maintenance in the latter case. Ample opportunity is afforded by the laws of the U. S. federal and state govts. to any one who believes he has been imprisoned wrongfully to secure vindication of his conduct and pecuniary recompense for the loss of his time and the damage to his feelings or his reputation. In such cases the release of the prisoner is effected by means of a writ of *habeas corpus* (q.v.), which insures his personal liberty till the justice of his sentence is more fully determined. The same writ will secure the release of a person lawfully imprisoned who may question the severity of his sentence. Pending final hearing persons released on *habeas corpus* are compelled to give bail for their appearance at the time and place of determination. There is no general law in the United States bearing on I., either in civil or criminal procedure. See ARREST: BANKRUPTCY: CONTEMPT OF COURT: DEBT, IMPRISONMENT FOR: DEBTOR AND CREDITOR, LAWS OF: INSOLVENCY: WITNESS.

IMPROBABLE, a. *ĭm-prŏb'ă-bl* [F. *improbable*—from L. *imprŏbābĭlĭs*, not deserving of approbation—from *im*, not; *probo*, I prove]: not likely to be true; unlikely; not to be expected. IMPROB'ABLY, ad. *-blĭ*. IMPROB'ABIL'ITY, n. *-bĭl'ĭ-tĭ*, unlikelihood.

IMPROBA'TION, in Scotch Law: disproving or setting aside a deed on the ground of falsehood or forgery.

IMPROBITY, n. *ĭm-prŏb'ĭ-tĭ* [F. *improbité*—from *improbĭtātĕm: im*, not, and Eng. *probity*]: want of integrity or honesty; baseness.

IMPROFICIENCY, n. *ĭm'prō-fĭsh'ĕn-sĭ* [*im*, not, and *proficiency*]: want of proficiency.

IMPROMPTU, n. *ĭm-prŏmp'tū* [F. *impromptu*, extempore—from L. *in promptu*, in readiness]: a short composition produced on the spur of the moment—generally something witty (see FANTASIA): ADJ. and AD. extempore; off hand.

IMPROPER, a. *ĭm-prŏp'ėr* [*im*, not, and *proper:* F. *impropre*—from L. *imprŏprĭŭs*, not befitting—from L. *im*, not; *prŏprĭŭs*, one's own, proper]: not suitable; not adapted to a particular end; not becoming; not decent. IMPROP'ERLY, ad. *-lĭ.* IMPROPRIETY, n. *ĭm'prŏ-prī'ĭ-tĭ* [F. *impropriété*]: unsuitableness to character or circumstances; an improper action or speech; an inaccuracy in language. IMPROPER FRACTION, a fraction whose numerator is either equal to or greater than the denominator.

IMPROPRIATE, a. *ĭm-prō'prĭ-āt* [L. *im*, into; *prŏprĭātus*, to appropriate—from *prŏprĭŭs*, peculiar, private]: devolved into the hands of a layman: V. to appropriate to private use; particularly to place ecclesiastical property in the hands of laymen. IMPRO'PRIATING, imp. IMPRO'PRIATED. pp. IMPRO'PRIA'TOR, n, *-tėr*, a layman who possesses or enjoys church lands. IMPRO'PRIA'TION, n. *-ā'shŭn*, the act of impropriating; the profits of ecclesiastical property in the hands of a layman—so named from being improperly held; the ecclesiastical property appropriated; exclusive possession. The practice of I. differs from the somewhat similar but more ancient usage of *appropriation*, inasmuch as the latter supposes the revenues of the appropriated benefice to be transferred to ecclesiastical or quasi-ecclesiastical persons or bodies, e.g. to a certain dignitary in a convent, a college, a hospital; while I. implies that the temporalities of the benefice are held by a layman. The practice of I., and still more that of appropriation, as in the case of monasteries, etc., and other religious houses, prevailed extensively in England before the Reformation; and on the suppression of the monasteries, all such rights were, in the reign of Henry VIII., vested in the crown, and were by the crown freely transferred to laymen, to whose heirs have thus descended not only the right to tithes, but also in many cases the entire property of rectories. The spiritual duties of such rectories are discharged by a clergyman, who is called a vicar, and who receives a certain portion of the emoluments of the living, generally consisting of a part of the glebe-land of the parsonage, together with what are called the 'small tithes' of the parish.

IMPROPRIETY: see under IMPROPER.

IMPROVE, v. *ĭm-prôv'* [L. *im*, in; OF. *prover;* L. *probārĕ*, to try, to esteem as good]: to make better; to advance in value, etc.; to grow better or wiser; to raise from good to better; to turn to good account. IMPROV'ING, imp.:

Adj. growing better; using to better advantage. Improved′, pp. *-prôvd′*. Improv′er, n. one who. Improv′able, a. *-ă-bl*, capable of being made better. Improv′ably, ad. *-blĭ*. Improv′ableness, n. *-bl-nĕs*, or Improv′abil′ity, n. *-bĭl′ĭ-tĭ*, capableness of being made better. Improv′ingly, ad. *-lĭ*. Improve′ment, n. *-mĕnt*, advancement nearer to perfection; progress; a making or growing better; practical application, as of a sermon.—Syn. of ‘improve’: to increase; advance; better; meliorate; ameliorate; heighten; mend; correct; rectify; perfect; augment; —of ‘improvement’: melioration; advancement; increase; instruction; edification.

IMPROVIDENT, a. *ĭm-prŏv′ĭ-dĕnt* [L. *im*, not; *providens*, or *providentĕm*, foreseeing (see Provident)]: wanting care to make provision for the future; neglecting measures for future safety or advantage; thoughtless. Improv′idently, ad. *-lĭ*. Improv′idence, n. *-dĕns*, want of foresight; want of due regard to consequences. Im′provi′ded, a. in *OE.*, unexpected; unforeseen.—Syn. of ‘improvident’: negligent; careless; heedless; inconsiderate.

IMPROV′ING LEASE: name, in Scotland, for a ‘repairing lease,’ by which the tenant undertakes to keep the premises in repair.

IMPROVISE, v. *ĭm′prō-vīz′* [F. *improvisé*, done extempore; *improviser*, to speak or compose without preparation—from It. *improvvisare*, to make verses extempore: L. *imprōvīsus*, unexpected]: to compose and recite without premeditation; to do offhand or in a rough and ready way. Improvi′sing, imp. Im′provised′, pp. *-vīzd′*, extemporized; done in a rough and ready way. Improvisate, a. *ĭm-prŏv′ĭ-sāt*, unpremeditated. Improvisation, n. *ĭm-prō′vī-sā-shŭn*, the art of improvising or speaking extempore. Improvisatore, n. *ĭm′prō-vēz-ă-tō′rā* [It.]: in *Italy*, one who makes and writes short poems on a given theme, without premeditation, and who sometimes sings and accompanies the voice with a musical instrument.—The talent of improvisation is found in races in which the imagination is more than usually lively, as in the Arabs, and in many tribes of negroes. Among the ancients, Greece was the land of improvisation. In modern Europe it has been almost entirely confined to Italy, where Petrarch, 12th c., introduced the practice of singing improvised verses to the lute; and down to the present day, the performances of improvisatori constitute one of the favorite entertainments of the Italians. Females (*improvisatrices*) have frequently exhibited this talent in high degree. Improvisation is not limited to brief poems of a few verses and of very simple structure, but is often carried on with great art, and in the form and to the length of a tragedy or almost of an epic poem. But when the productions of the most admired improvisatori have been given to the world through the press, they have never been found to rise above mediocrity. It is worthy of notice that the greater number of the celebrated improvisatori of Italy have been born in Tuscany or the Venetian territories. Siena and Verona have been especially productive of them. Some of the principal are, Serafino d'Aquila (died 1500), Metastasio (q.v.), who soon abandoned the art, Zucco (died 1764), Serio and Rossi (beheaded at Naples 1799), Gianni (pensioned by Bonaparte), and Tommaso Sgricci (died 1836). The best known *improvisatrices* are Magdalena Moralli Fernandez (died 1800), Teresa Bandettini (born 1756), Rosa Taddei (born 1801), Signora Mazzei (probably the first in point of talent), and more lately Giovannina Milli. IM'PROVIS'ATO'RI, n. plu. *-tō'rē.* IM'PROVIS'ATRICE, n. fem. *-vēz'ă-trĭs* or *-trē'chā* [It.]: a woman who makes and recites extempore verses. IM'PROVIS'ATRI'CI, plu. *-vēz-ă-trē'chē.*

IMPRUDENT, a. *ĭm-prô'dĕnt* [F. *imprudent*—from L. *imprūden'tem*, not foreseeing, inconsiderate—from *im*, not; *prūdens*, prudent: It. *imprudente*]: indiscreet; not attentive to the consequences of words or actions; rash. IMPRU'DENCE, n. *-dĕns* [F.—L.]: indiscretion; want of due regard to consequences. IMPRU'DENTLY, ad. *-lĭ.*—SYN. of 'imprudent': heedless; injudicious; incautious; unadvised.

IMPUDENT, a. *ĭm'pū-dĕnt* [F. *impudent*—from L. *impŭden'tem*, without shame—from *im*, not; *pudens*, modest: It. *impudente*]: without modesty; bold; shameless; saucy; insolent. IM'PUDENTLY, ad. *-lĭ.* IM'PUDENCE, n. *-dĕns* [F.—L.]: want of modesty; effrontery; impertinence.—SYN. of 'impudence': shamelessness; audacity; boldness; assurance; insolence; sauciness; rudeness; pertness;—of 'impudent': audacious; brazen; bold-faced; immodest; pert; impertinent; rude; unblushing; forward.

IMPUGN, v. *ĭm-pūn'* [L. *impugnārĕ*, to fight against, to assail—from *im*, in or on; *pugno*, I fight: F. *impugner*, to impugn]: to attack or assail by words; to call in question; to contradict. IMPUGN'ING, imp. IMPUGNED', pp. *-pūnd'.* IMPUGN'ER, n. *-ėr*, one who. IMPUGN'ABLE, a. *-ă-bl*, that may be impugned or opposed.

IMPULSE, n. *ĭm'pŭls* [L. *impulsus*, pushed or driven against a thing—from *im*, on or against; *pello*, I drive: It. *impulso*, impulse]: force suddenly communicated; influence acting on the mind; the effect of some sudden motion. IMPUL'SION, n. *-pŭl'shŭn* [F.—L.]: the sudden action of a moving body on another body; influence on the mind. IMPUL'SIVE, a. *-sĭv*, having the power of driving or impelling; liable to be moved; moved to action by present feelings. IMPUL'SIVELY, ad. *-lĭ.* IMPUL'SIVINESS, n. *-nĕs.*

IMPUL'SIVE MAD'NESS: sudden access of violent insanity. The approaches of mental disease are generally slow; but instances occur where, without announcement, without any preliminary stage of disease or disturbance, an individual, apparently of sound mind, is suddenly seized with mania, presents symptoms of incontrollable violence, perpetrates acts of atrocity or absurdity, altogether inconsistent with his previous disposition and deportment; and then, nearly as quickly, subsides into his ordinary state and habits, retaining no, or a very imperfect, recollection of the events which occurred during the paroxysm. It is not, however, in the suddenness or shortness of the paroxysm that the essential characteristic consists. During the continuance of such an affection, three mental conditions are distinctly traced: 1. The sudden arising and irresistible dominion of a propensity; 2. The abolition or impairment of the apprehension of the real and ordinary relations of the individual; 3. The suspension of the powers by which such propulsions are prevented from arising, or ruled and regulated when they do arise. Alienation of this kind has been recognized chiefly when the instincts are involved; and the most striking illustrations are derived from cases of homicidal or sanguinary tendency, simply because the results may convulse society, or come under the notice of courts of law. But many examples exist of brief periods of aberration which could not be instigated by passion, and involved nothing criminal. A lady is mentioned who never entered church but she was impelled to shriek, or saw plate-glass but she was impelled to break it; and the incongruous laughter, the grotesque gesticulations, and the involuntary and repulsive associations to which good and great men have been subject, all must be placed under this category.

See Marc, *De la Folie:* also INSANITY: LUNACY: IMITATIVE INSANITY: ETC.: and authorities there referred to.

IMPUNITY, n. *ĭm-pū′nĭ-tĭ* [F. *impunité*—from L. *impūnĭtātem*, freedom or safety from punishment—from *im*, not; *pœna*, punishment: It. *impunità*]: exemption or freedom from punishment, penalty, or injury.

IMPURE, a. *ĭm-pūr′* [F. *impur*—from L. *impūrŭs*, impure, unclean—from *im*, not; *pūrŭs*, pure: It. *impuro*]: not pure; foul; unclean; unchaste; unholy. IMPURE′LY, ad. *-lĭ*. IMPURE′NESS, n., also IMPU′RITY, n. *-pū′rĭtĭ* [F. *impureté*]: foulness; any foul matter; want of purity; want of holiness. —SYN. of ‘impure,’: tinctured; feculent; defiled; unhallowed; lewd, obscene; polluted.

IMPURPLE, v. *ĭm-pėr′pl* [*im*, into, and *purple*]: to color or tinge with purple. IMPUR′PLING, imp. IMPUR′PLED, pp. *-pld.*

IMPUTA′TION: technical expression in some systems of theology; denoting the transference of guilt or of merit of punishment, or of reward. The doctrine of the I. of sin is the doctrine which inculcates that all mankind are, as by a formal governmental act of God, made sharers in the fact and consequences of Adam's sin; and the correlative doctrine of the I. of Christ's righteousness is that which inculcates that the merit or righteousness of Christ is, as by a formal governmental act of God, transferred to those who believe in Him, or, in other words, that they are made sharers in His merit or righteousness. An idea of some transference, or of some intercommunication of good and evil, answers to undoubted realities of human life, both bodily and spiritual; but it has become degraded and materialized, in some of its common representations in theology. The doctrine of the imputation of Adam's sin, e.g., expresses to some minds not only the idea of the participation of the human race in the consequences of Adam's transgression, so that, because he sinned and fell from innocence, they, the inheritors of his corrupt nature, are involved in the miseries of a fallen state, and also proceed to sin; but, moreover, the idea, that the sin of Adam in its direct guilt and wickedness is transferred to his posterity. Thus there is a formal imputation of the sin of Adam to all his descendants: God is supposed to hold all mankind guilty on the ground that Adam disobeyed God. To give a logical justification to this view it is assumed that God entered into a covenant with Adam (see COVENANT), by which the latter was regarded as a representative of the whole human race; so that, when he fell, all mankind sinned in him and fell with him. In the same manner, the merit or righteousness of Christ is supposed to be imputed to believers by a direct and formal transference of the one to the account of the other. In both cases, it is the idea of formal and direct exchange by sovereign power that is prominent; and according to some theologians, this idea alone answers to *imputation* of sin or of righteousness. To *impute* sin, is to deal with a *man as a sinner*, not on account of his own act, or at least not primarily on this account, but primarily on account of the act of another; and to *impute* righteousness, is to deal with man as righteous, not primarily because *he is righteous*, nor primarily because he has chosen to take part in the righteousness of Christ, so making that in a moral sense his own; but on account of the righteousness of Christ formally and directly *reckoned as his*.

This is an illustration of the tyranny which technical phrases are apt to exercise in theology. When men coin an imperfect phrase to express a spiritual reality, the reality is likely to be forgotten in the phrase, and men play with the latter as a logical counter, having a force and meaning of its own. Imputation of sin and imputation of righteousness have in this way come to represent legal or pseudo-legal processes in theology, though the working out of the mere legal analogies suggested by the word. But the spiritual reality which lies behind the phrases in both cases is simple enough as it stands revealed in the Scriptures. Imputation of sin is and can be nothing else than the expression of a certain natural unity of Adam and his race. Adam 'being the root of all mankind,' the stock which has grown from this root must share in its degeneracy. The laws of spiritual life and of historical continuity, imply this; it requires no formal or legal process, therefore, to account for the sinfulness of mankind as derived from a sinful source. Men sin, and thus become sinners, because Adam sinned. The fountain having become polluted, the stream is polluted. Men are involved in the conditions which naturally pertain to his guilt by the conditions of human historical existence; but, nevertheless Adam's sin is not their sin, and cannot in the strict sense be imputed to them, for sin is essentially voluntary in every case—an act of self-will; so that every man's sin is his own and not another's. In the same manner, the highest meaning of the imputation of the righteousness of Christ lies, not in a mechanical or governmental transfer, but in the spiritual unity of the believer with Christ; so that he is in heart one with Christ, and Christ one with him, and in a vital sense he becomes a partaker of the divine nature. The notion of formal legal transference is an after-thought—a mechanical invention of polemical logic; and the fact itself is deeper and truer than the phrase that covers it. The race one with Adam—the race endowed with the privilege of being one with Christ, through a new spiritual birth from on high—all Christ's believing disciples actually one with Christ—these are the great vital facts which the term *imputation* lowers and enfeebles with a technical human wisdom.—The logic of theology has evolved other applications of the phrases; but these applications are rather the refinements of theological pedantry than the expression of true spiritual relations. The term I. is now of much less frequent use than formerly.

IMPUTE, *ĭm-pūt'* [F. *imputer*—from L. *impŭtārĕ*, to bring or enter into the account—from *im*, into; *pŭtō*, I reckon: It *imputare*]: to charge; to attribute; to reckon as belonging to one that which belongs to another. **IMPU'TING**, imp. **IMPU'TED**, pp. **IMPU'TER**, n. *-tėr*, one who. **IMPU'TABLE**, a. *-tă-bl* [F.—L.]: ascribable; that may be imputed to. **IMPU'TABLY**, ad. *-blĭ*. **IMPU'TABLENESS**, n. *-bl-nĕs*. **IMPU'TATIVE**, a. *-tă-tĭv*, that may be imputed. **IMPU'TATIVELY**, ad. *-lĭ*, by imputation. **IMPUTATION**, n. *ĭm'pū-tā'shŭn* [F.—L.]: charge of evil; censure; reproach; in *theol.*, charging to the account of one what properly belongs to another; in *OE.*, slight notice; hint.—**SYN.** of 'impute': to ascribe; reckon; regard; consider.

IN, prep. *ĭn* [AS., Ger., Dut., and Dan. *in*, in: Icel. *inni*, within, also a house]: placed before an object, *in* is used to indicate a variety of relations; denoting presence or situation; within; inside of; not outside of; during, as *in* the year; by or through; on account of; out of, as nine *in* ten: **AD.** within some place; not out; denoting entrance; closely; often used for *into* or *inside*, as he will come *in*, that is, *into* or *inside the house;* used without the object being expressed, as our party is *in*, and our opponents are *out*, that is, *in office*, and *out of office*. **INASMUCH**, since; seeing that. **IN BLANK**, signed with the name only, and without other significant writing. **IN THAT**, because; for the reason that. **INS AND OUTS**, nooks and corners. **IN THE NAME OF**, in behalf of; on the part of; a common phrase in invoking, swearing, and praying. **BREED IN AND IN**: see under **BREED**. **PLAY IN AND OUT**, to conduct one's self in any matter in a fast and loose way. *Note.*—**IN** the preposition is used also as an Eng. prefix in composition, as, *inborn*, *inbred*, *inlet*, *instep*, *inwrap*, etc. We have, however, the Latin cognate from in *inaugurate*, *incarcerate*, *incarnate*, etc.—see next entry.

IN, prefix, *ĭn* [L. *in*, in, within—akin to Skr. *an;* Gr. *en;* AS. *in*, in, into]. **IN**, as a prefix, with its forms **IL**, **IM**, **IR**, signifies *in*, *into*, *on*, in verbs and nouns, as *in*clude, to shut *in*, *in*cur, to run *into;* followed by *l*, *in* becomes *il*, as in *il*luminate, to throw light *on;* followed by *b*, *p*, or *m*, *in* becomes *im*, as in *im*mure, to put *within* walls, *im*bibe, to drink *in*, *im*port, to carry *in;* followed by *r*, *in* becomes *ir*, as in *ir*rigate, to let water flow *on*.

IN, prefix, *ĭn* [L. *in*, not—akin to Skr. and Gr. *an;* Goth. and Ger. *un*, not]. IN, as a prefix, with its forms IG, IL, IM, IR, signifies *not* in adjectives, as *in*correct, *not* correct; followed by *gn*, *n* is suppressed, and *in* becomes *i*, as in *i*gnoble, *not* noble, *i*gnorant, *not* knowing; followed by *l*, *in* becomes *il*, as in *il*licit, not permitted; followed by *p* or *m*, *in* becomes *im*, as in *im*mature, *not* ripe, *im*prudent, *not* prudent; followed by *r*, *in* becomes *ir*, as in *ir*regular, *not* according to rule.

INABILITY, n. *ĭn'ă-bĭl'ĭ-tĭ* [L. *in*, not, and *ability*]: want of power or strength; want of adequate means; incapacity.—SYN.: incompetence; disability; impotence; weakness.

INABSTINENCE, n. *ĭn-ăb'stĭn-ĕns* [*in*, not, and *abstinence*]: in *OE.*, want of power to abstain or refrain from.

INACCESSIBLE, a. *ĭn'ăk-sĕs'sĭ-bl* [F. *inaccessible:* L. *in*, not, and Eng. *accessible*]: not to be reached; not to be obtained or approached. IN'ACCES'SIBLY, ad. *-blĭ*. IN'ACCES'SIBIL'ITY, n. *-bĭl'ĭ-tĭ*, or IN'ACCES'SIBLENESS, n. *-bl-nĕs*, the quality or state of being inaccessible.

INACCURATE, a. *ĭn-ăk'kū-rāt* [L. *in*, not, and *accurate*]: not exact or correct; not according to truth. INAC'CURATELY, ad. *-lĭ*. INAC'CURACY, n. *-ră-sĭ*, defect; want of exactness.—SYN. of 'inaccuracy': error; defect; fault; mistake; blunder.

INACTION, n. *ĭn-ăk'shŭn* [F. *inaction:* L. *in*, not, and Eng. *action*]: want of action; cessation of action; forbearance from labor; idleness; rest. INAC'TIVE, a. *-tĭv*, not active; dull; slothful; idle. INAC'TIVELY, ad. *-lĭ*. IN'ACTIV'ITY, n. *-ĭ-tĭ* [F. *inactivité*]: habitual idleness; want of action or exertion.—SYN. of 'inactive': inert; sluggish lazy; indolent.

INADEQUATE, a. *ĭn-ăd'ĕ-kwāt* [L. *in*, not, and *adequate*]: not equal to the real purpose, state, or condition of a thing; incomplete; defective. INAD'EQUATELY, ad. *-lĭ*. INAD'EQUATENESS, n., or INAD'EQUACY, n. *-kwă-sĭ*, quality of being unequal to the purpose; incompleteness; defectiveness.—SYN. of 'inadequate': insufficient; unequal; incommensurate; disproportionate; incapable; incomplete.

INADMISSIBLE, a. *ĭn'ăd-mĭs'sĭ-bl* [F. *inadmissible:* L. *in*, not, and Eng. *admissible*]: not proper to be allowed or received; that cannot be received. IN'ADMIS'SIBIL'ITY, n. *-bĭl'ĭ-tĭ*, the quality of being inadmissible.

INADVERTENT, a. *ĭn'ăd-vėr'tĕnt* [mid. L. *inadverten'; tĭă*, inadvertence—from L. *in*, not; *advert'ens*, directing or turning toward: F. *inadvertance:* Sp. *inadvertencia*, carelessness, heedlessness]: heedless; not turning the mind to; inconsiderate; careless. IN'ADVER'TENTLY, ad. *-lĭ*. IN'-

ADVER'TENCE, n. *-tĕns*, or IN'ADVER'TENCY, n. *-tĕn-sĭ*, oversight; mistake; any mistake or fault from want of forethought; heedlessness.—SYN. of 'inadvertency': thoughtlessness; inattention; carelessness; negligence.

INAGUA, *ē-nâ'gwâ*, GREAT AND LITTLE: two most southerly islands of the Bahama group. The Great I. (50 m. long, 25 m. wide), is remarkable for having its longer dimension almost at right angles to those of the rest of the cluster. The Little I. lies about 12 m. n., and measures 8 m. by 6. Pop. of both islands, about 1,000, of whom only a few are white.

INAIDABLE, a. *ĭn-ād'ă-bl* [*in*, not, and *aidable*]: in *OE.*, not to be assisted.

INAJA PALM, *ĭn-â'ja* (*Maximiliana regia*): S. American palm, common in the countries near the Amazon; having a lofty, massive stem; very long, drooping, pinnate leaves, with leaflets in groups of three, four, or five at intervals along the midrib, from which they stand out in different directions; numerous spadices; large woody spathes; and densely clustered elongate fruit, with a hard stony seed, a layer of soft pulp, and a tough skin. The leaves are sometimes more than 50 ft. long. The great woody spathes are used by hunters to cook meat in, and with water in them, they

Inaja Palm (*Maximiliana regia*).

stand the fire well enough for the purpose. They are also used as baskets and as cradles by the Indians. The fruit is eaten by the Indians, and is particularly attractive to monkeys and some kinds of birds.

INALIENABLE, a. *ĭn-āl'yĕn-ă-bl* [F. *inaliénable:* L. *in*, not, and Eng. *alienable*]: that cannot be legally or justly transferred to another. INAL'IENABLY, ad. *-ă-blĭ.* INAL'IENABLENESS, n. *-bl-nĕs.*

INAMORATO, n. *ĭn-ăm'ō-râ'tō* [It. *innamorato*, a lover —from L. *amor*, love]: a lover; one in love. INAM'ORA'TA, n. fem. *-râ'tă*, a woman in love.

INANE, a. *ĭn-ān'* [L. *inānĭs*, empty: It. *inane*]: empty; void; useless; senseless. INANE'LY, ad. *-lĭ.* INANITY, n. *ĭn ăn'ĭ-tĭ* [F. *inanité*]: emptiness; vanity. INAN'ITIES, n. plu. *-ĭ-tĭz*, vanities; sillinesses. INANITION, n. *ĭn'ă-nĭsh'ŭn* [F.]: emptiness; want of fulness; starvation; a condition of starvation brought about by bad food, or food deficient in quantity: see STARVATION.

INANIMATE, a. *ĭn-ăn'ĭ-māt* [L. *inanĭmātus*, lifeless—from *in*, not; *anĭmātus*, living: It. *inanimato*]: destitute of life; dead; lifeless; dull; inactive; not sprightly. INAN'IMATED, a. deprived of animation; inanimate. INAN'IMA'TION, n. *-mā'shŭn*, lifelessness.—SYN. of 'inanimate': spiritless; inert; soulless.

INANITION, INANITY: see under INANE.

INANTHERATE, a. *ĭn-ăn'thėr-āt:* in *bot.*, destitute of an anther: used of a sterile or abortive stamen.

INAPPETENCE, n. *ĭn-ăp'pĕ-tĕns*, or INAP'PETENCY, n. *-tĕn-sĭ* [F. *inappétence: in*, not, and Eng. *appetence*]: want of desire to imbibe nourishment; want of inclination.

INAPPLICABLE, a. *ĭn-ăp'plĭ-kă-bl* [F. *inapplicable:* L. *in*, not, and Eng. *applicable*]: not suited or suitable to the purpose; unadapted. INAPPLICATION, n. *ĭn-ăp'plĭ-kā'shŭn* [F.—L.]: want of attention; unfitness; negligence; neglect of study or industry. INAP'PLICABIL'ITY, n. *-bĭl'ĭ-tĭ*, the state or quality of being inapplicable.—SYN. of 'inapplicable': unsuitable; unsuited; inapposite; inappropriate.

INAPPOSITE, a. *ĭn-ăp'pō-zĭt* [*in*, not, and *apposite*]: not fit or suitable; not pertinent.

INAPPRECIABLE, a. *ĭn'ăp-prē'shĭ-ă-bl* [F. *inappréciable: in*, not, and Eng. *appreciable*]: that cannot be duly valued; not to be estimated or ascertained.

INAPPREHENSIBLE, a. *ĭn-ăp'prĕ-hĕn'sĭ-bl* [*in*, not, and *apprehensible*]: not intelligible. INAP'PREHEN'SIVE, a. *-sĭv*, slow in apprehending; regardless.

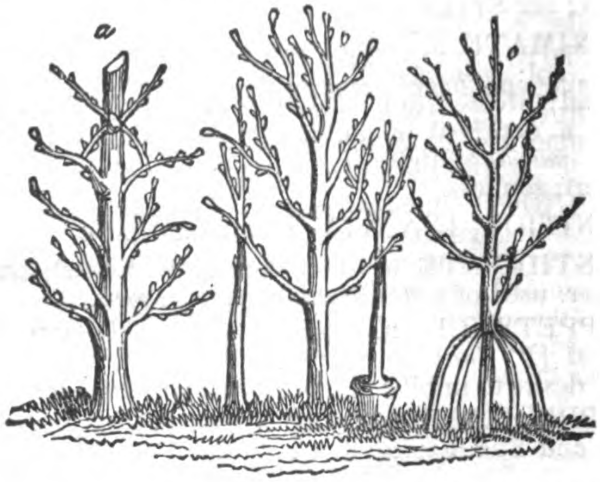
INAPPROACHABLE, a. *ĭn'ăp-prōch'ă-bl* [*in*, not, and *approachable*]: not to be approached; inaccessible.

INAPPROPRIATE, a. *ĭn'ăp-prō'prĭ-āt* [*in*, not, and *appropriate*]: unsuited; not proper. IN'APPRO'PRIATELY, ad. *-lĭ.* IN'APPRO'PRIATENESS, n.

INAPT, a. *ĭn-ăpt'* [L. *ineptus*, improper, inconsistent—from *in*, not, *aptus*, fit]: not apt. INAPT'LY, ad. *-lĭ.* IN-

AP'TITUDE, n. *-tĭ-tūd* [F.—L.], or **INAPT'NESS**, n. unfitness; unsuitableness.

INARCH, v. *ĭn-ârch'* [L. *in*, into; *arcŭō*, I bend like a bow]: to graft by uniting a growing plant or branch to a neighboring stock without separating it from the earth or from the parent tree. **INARCH'ING**, imp.: N. a mode of grafting by approach, by bending two growing plants toward each other, and causing a branch of the one to unite to a branch of the other. **INARCHED'**, pp. *-ârcht'*.—Branches growing across one another sometimes become inarched of themselves; and it is probable that an observation of such growth first led to the invention of grafting. Inarching is practiced in cases in which the ordinary modes of grafting are not found readily to succeed, as with camellias. The stocks to be grafted upon are planted, or placed in pots, around the plant from which the grafts are to be taken. Four or five months are generally sufficient to complete the union; but sometimes two years are necessary. When the union is complete, the scion is separated by a sloping cut from its parent plant. Care must always be taken that the parts to be joined together be cut to fit one another as exactly as possible, and they are then firmly tied together, and so covered that neither air nor water may penetrate. It is desirable that they be branches of nearly the same thickness. They should be cut amost down to the pith, but the pith must not be injured. Inarching is performed in spring, after sap has begun to circulate. The accompanying figure illustrates several ways of inarching. For example, two branches of a tree, *a*, may be bent so as to meet and strike upon a wound in the main stem, by which a gap will be filled up; one growing tree, *b*, either from the ground or a pot, may be lead to unite with another; or several suckers, *c*, may be led from the ground archwise to strike upon a point in the stem, thus bringing fresh aid to the productive part of the tree. By such means, quickset-hedges are sometimes thickened like a net-work, so as greatly to improve their appearance and protective qualities.



INARTICULATE, a. *ĭn'âr-tĭk'ū-lāt* [L. *in*, not; *articŭlātus*, furnished with joints—from *articŭlŭs*, a joint, as of the body: F. *inarticulé*, inarticulate (see ARTICULATE)]: not uttered with a distinct spoken sound; in *bot.*, without joints or interruption to continuity. IN'ARTIC'ULATELY, ad. *-lĭ.* IN'ARTIC'ULATENESS, n. or IN'ARTIC'ULA'TION, n. *-lā'shŭn*, indistinctness of spoken sounds.

INARTIFICIAL, a. *ĭn-âr'tĭ-fĭsh'ăl* [*in*, not, and *artificial*]: not done by art; simple; natural; artless. INAR'TIFI'CIALLY, ad. *-lĭ.*

INASMUCH, ad. or conj. *ĭn-ăz-mŭch'* [*in*, *as*, and *much*]: seeing that; this being the fact.—SYN.: since; because; for; as.

INATTENTIVE, a. *ĭn'ăt-tĕn'tĭv* [F. *inattentif*, inattentive: *in*, not, and Eng. *attentive*]: careless; negligent; not fixing the mind on. IN'ATTEN'TIVELY, ad. *-lĭ.* IN'ATTEN'TION, n. *-shŭn* [F.—L.]: the want of fixing the mind steadily on; neglect.—SYN. of 'inattention': inadvertency; thoughtlessness; heedlessness;—of 'inattentive': thoughtless; heedless; remiss; regardless.

INAUDIBLE, a. *ĭn-āw'dĭ-bl* [L. *in*, not, and *audible*]: that cannot be heard; wanting in distinctness of sound. INAU'DIBLY, ad. *-blĭ.* INAU'DIBIL'ITY, n. *-bĭl'ĭ-tĭ*, or INAU'DIBLENESS, n. *-bl-nĕs*, state or quality of not being heard.

INAUGURAL, a. *ĭn-aw'gū-răl* [F. *inaugural*—from *inaugurer*, to inaugurate—from L. *inaugŭrārĕ*, to consult the divining birds, to inaugurate; *inaugŭrātus*, inaugurated—from *in*, into; L. *augur*, a soothsayer; *augŭrō*, I presage or divine, as the success of any enterprise]: pertaining to inauguration; made or done at the introduction to an office, or at the beginning of an enterprise, as an inaugural address. INAU'GURATE, v. *-gū-rāt*, to commence with suitable ceremonies; to begin with good omens; to invest with an office in a formal manner. INAU'GURATING, imp. INAU'GURATED, pp. INAU'GURATOR, n. *-rā-tėr*, one who. INAU'GURA'TION, n. *-rā'shŭn* [F.—L.]: the act of investing with an office with suitable solemnity; the solemn or formal beginning of any movement or course of action; the opening in a formal manner of a public building. INAU'GURATORY, n. *-tėr-ĭ*, pertaining to inauguration.

INAUSPICIOUS, a. *ĭn'aw-spĭsh'ŭs* [*in*, not, and *auspicious*]: unlucky; unfavorable; ill-omened; unfortunate. IN'AUSPI'CIOUSLY, ad. *-lĭ.* IN'AUSPI'CIOUSNESS, n.

INBOARD, a. or ad. *ĭn'bōrd* [*in*, into, and *board*]: applied to anything within the hold of a ship.

INBOND, a. *ĭn'bŏnd:* in *arch.*, term applied to a stone or brick laid lengthwise across a wall; as distinguished from *outbond*, in which it is laid with its length parallel to the face of the wall. An *inbond* and *outbond* wall is one in which the stones or bricks are laid alternately across and in the direction of the face of the wall.

INBORN, a. *ĭn'bŏrn* [*in*, into, within, and *born*]: implanted by nature; innate.—SYN.: inbred; inherent; natural.

INBREATHE, v. *ĭn-brēth′* [*in*, into, and *breathe*]: to infuse by breathing; to inspire. **INBREATH′ING**, imp. **INBREATHED′**, pp. *-brēthd′*.

INBREED, v. *ĭn-brēd′* [*in*, into, and *breed*]: to breed or generate within. **IN′BRED**, a. *-brĕd*, natural; bred within.

INCA, n. *ĭng′kă:* the king or prince of Peru before its conquest by the Spaniards: see **PERU**.

INCAGE, v. *ĭn-kāj′* [F. *encager*, to incage: F. *en* for L. *in*, in, and *cage*]: to confine, as in a cage; to coop up. **INCA′GING**, imp. **INCAGED′**, pp. *-kājd′*.

INCALCULABLE, a. *ĭn-kăl′kū-lă-bl* [F. *incalculable: in*, not, and Eng. *calculable*]: not to be computed or reckoned. **INCAL′CULABLY**, ad. *-lă-blĭ*.

INCALESCENCE, n. *ĭn-ka-lĕs′sĕns*, or **INCALESCENCY**, n. *-sĭ:* the state of being incalescent; a growing warm; warmth; incipient heat. **INCALES′CENT**, a. *-sĕnt*, becoming or growing warm.

INCANDESCENT, a. *ĭn′kăn-dĕs′sĕnt* [F. *incandescent*—from L. *incandescen′tem*, becoming warm, glowing—from *in*, into, on; *candes′co*, I become of a bright glittering white: It. *incandescente*]: white or glowing with heat. **INCANDES′CENCE**, n. *-sĕns* [F.—L.]: the glowing or luminous appearance which bodies assume when intensely heated.

INCANESCENT, a. *ĭn′kă-nĕs′sĕnt* [L. *incānescen′tem*, becoming white—from *canes′cĕrĕ*, to become white or hoary]: in *bot.*, hoary or gray in appearance.

INCANOUS, a. *ĭn-kā′nus* [L. *incanus*, quite gray, hoary]: in *bot.*, hoary.

INCANTATION, n. *ĭn′kăn-tā′shŭn* [F. *incantation*—from L. *incantātiōnem*—from *incantārĕ*, to chant a magic formula against some one—from *in*, into; *canto*, I sing; as *charm* is only a disguised form of *carmen*, song]: the act of enchanting by words of sorcery. **INCAN′TATORY**, a. *-tėr-ĭ*, dealing by enchantment.—*Incantation* denotes one of the most powerful and awe-inspiring modes of magic (q.v.), viz., that resting on a belief in the mysterious power of words solemnly conceived and officially and passionately uttered.

There is in the human voice, especially in its more lofty tones, wonderful power to stir men's hearts. When to this we add that poetic utterance is a special and exceptional gift; that the language of primitive nations is crude and unmanageable, the words being as difficult to weld together as pieces of cast-iron; that it is only when the poet's mind has risen to unusual heat that he can fuse them into those rhythmical sequences that please the ear and hang together in the memory; that, in short, his art is a mystery to himself, an inspiration,—we need not wonder at the feeling with which everything in the form of verse or metre was viewed. The singing or saying of such compositions, which could thus stir the blood of the hearers, they knew not how, what other effects might it not produce? Accordingly, there is no end to the power ascribed to incantations, especially when accompanied, as they generally were, with the concocting of drugs and other magical rites. They could heal or kill. If they could not raise from the dead, they could make the dead speak, or 'call up spirits from the vasty deep,' to unveil the future. They could extinguish fire; darken the sun or moon; make fetters burst, a door or a mountain fly open; blunt a sword; make a limb powerless; destroy a crop, or charm it away into another's field.

The prayers of heathens, whether for blessings or for curses, partake largely of the nature of magical incantations. They are not supposed to act as petitions addressed to a free agent, but by an inherent force which even the gods cannot resist. This notion is prominent in Hinduism and Buddhism; but it more or less disguisedly pervades all superstitious worship. For almost every occasion or operation of life there were appropriate formulas to be repeated in order to secure success; and many of these, with that reverence for antiquity and that conservative tendency which always characterize superstition, continue to live in popular memory, though often the words are grotesque or absurd, or so old as to be unintelligible. The Romans, in the days of Cato, used incantations for curing dislocations, full of words whose meaning had been lost. A form of words used to this day in Shetland for healing a sprain can be traced back to the 10th c. In its earliest form, as found in an old German manuscript, it relates how Woden and Baldur riding out to hunt, Baldur's horse dislocated its foot, and how Woden, using charmed words, set bone to bone, etc., and so healed the foot. The repetition of this rhymed narration acted as a charm to heal other lame horses. The modern version of this tradition, as current in Norway, makes the accident happen to the horse of the *Lord Jesus*, who himself performs the cure. In Shetland, also, it is the Lord, meaning Jesus, that is substituted for Woden; and the formula is applied to healing the limbs of persons as well as those of horses. The operation is thus described in R. Chambers's *Popular Rhymes of Scotland:* 'When a person has received a sprain, it is customary to apply to an individual practised in casting the "wresting-thread." This is a thread spun from black wool, on which are cast nine knots, and tied round a sprained leg or arm. During the time the operator is putting the thread round the affected limb, he says, but in such a tone of voice as not to be heard by the bystanders, nor even by the person operated upon:

Our Lord rade,
His foal's foot slade;
Down he lighted,
His foal's foot righted.
Bone to bone,
Sinew to sinew,
Blood to blood,
Flesh to flesh.
Heal, in name of the Father, Son, and Holy Ghost.'

INCAPABLE, a. *ĭn-kā'pă-bl* [F. *incapable: in*, not, and Eng. *capable*]: unable; unequal to; disqualified by disposition or law; that cannot stoop or condescend to, as to a falsehood: N. one insufficiently able to exercise his mental. moral, or physical powers; an inebriate. INCA'PABLY, ad. *-blĭ*. INCA'PABIL'ITY, n. *-bĭl'ĭ-tĭ*, natural inability; legal disqualification.—SYN. of 'incapable': incompetent; disqualified; unfit; deficient; insufficient.

INCAPACIOUS, a. *ĭn'kă-pā'shŭs* [*in*, not, and *capacious:* L. *in*, not; *capacĭtas*, largeness]: not large or spacious; of small size. IN'CAPA'CIOUSNESS, n. *-nĕs*. IN'CAPAC'ITATE, v. *-păs'ĭ-tāt*, to render incapable, unable, or unfit; to disqualify. IN'CAPAC'ITATING, imp. IN'CAPAC'ITATED, pp. IN'CAPAC'ITY, n. *-ĭ-tĭ* [F. *incapacité*]: want of natural power to receive, contain, or understand—applied to the mind; defect of understanding; inability; disqualification.—SYN. of 'incapacity': unfitness; incapability; incompetency; defect; absence; narrowness.

INCARCERATE, v. *ĭn-kâr'sėr-āt* [mid. L. *incarcĕrātus*, put into prison: It. *incarcerare;* F. *incarcérer*, to imprison —from L. *in*, into; *carcer*, a prison: comp. Gael. *carcair*, a prison, a strong box]: to imprison; to confine in a jail. INCAR'CERATING, imp. INCAR'CERATED, pp. INCAR'CERA'-TION, n. *-ā'shŭn* [F.—L.]: imprisonment; confinement.

INCARNADINE, v. *ĭn-kâr'nă-dĭn* [F. *incarnadin*, of a deep or bright carnation color: old It. *incarnadino*, flesh, color—from mid. L. *incarnātus*, clothed with flesh—from *in*, in or on; *cărō* flesh]: in *OE.*, to dye of a red or carnation color: ADJ. flesh-colored. INCAR'NADINING, imp. INCAR'NADINED, pp. *-dĭnd*.

INCARNATE, n. *ĭn-kâr'nāt* [It. *incarnato*, made flesh; F. *incarnat*, of a·flesh-color—from mid. L. *incarnātŭs*, clothed with flesh or with a body—from L. *in*, in or on; *cărō*, flesh]: clothed with flesh; embodied in flesh: V. *literally*, to clothe with flesh; to assume the human form and nature. INCAR'NATING, imp. INCAR'NATED, pp. IN'CARNA'TION n. *-nā'shŭn* [F.—L.]: the act of assuming a humanbody, and taking the nature of man: in *theol.*, the union of the Godhead with manhood in Christ. We read (Jn. i. 14), 'The Word became flesh;' but this is understood as signifying, not a change of nature, but an assumption of human nature into personal union with the divine nature. In accordance with Lk. i. 35, and other utterances of Scripture, the formation of the human nature of Christ is ascribed to the Holy Spirit. The reality of the human nature of Christ was much disputed in the first ages of Christianity (see DOCETÆ); but in later times the chief dispute as to the person of Christ has related to his divine nature. While the fact of the incarnation is generally asserted by all who profess Christianity, except Unitarians (q.v.), no complete philosophy of it is attempted or deemed desirable or even possible; as indeed, no complete *philosophy* of the two allied facts—the being of God and the nature of Man—has yet been found possible to human thought. Such facts are not included *within* philosophy, because to Christian thinkers in general they are the necessary basis on which any philosophical system must stand. The fact of the divine incarnation in some mode is felt to be fundamental to the whole system of Christianity. In the standard doctrine of it, it is maintained that, in union with the divine nature of the Son of God, there was and is in the person of Christ, not only a true human body, but a human 'reasonable' soul.—See CHRIST, THE: CHRISTOLOGY: CHALCEDON, COUNCIL OF: JESUS CHRIST: MESSIAH: TRINITY, DOCTRINE OF THE.

INCASE, v. *ĭn-kās'* [*in*, into, and *case*]: to inclose; to cover or surround with something solid. INCA'SING, imp. INCASED', pp. *-kāst'*.

INCAUTIOUS, a. *ĭn-kaw'shŭs* [L. *incautus*, incautious, heedless: *in*, not, and Eng. *cautious*]: unwary; heedless; not attentive to probable effects and consequences. INCAU'TIOUSLY, ad. *-lĭ*. INCAU'TIOUSNESS, n. *-nĕs*, want of caution; want of foresight; heedlessness.—SYN. of 'incautious': indiscreet; imprudent; inconsiderate; thoughtless; improvident; negligent; careless; impolitic.

INCENDIARY, n. *ĭn-sĕn'dĭ-ă-rĭ* [F. *incendiaire*, incendiary—from L. *incendĭārĭŭs*, an incendiary—from *incendo*, I set fire to: It. *incendiare;* F. *incendier*, to set fire to]: one who wilfully and maliciously sets fire to the houses, buildings, or property of another, or to his own; one who so inflames the public mind as to unduly promote discontent and faction: ADJ. relating to the wilful burning of a building; inflammatory; seditious. INCEN'DIARISM, n. *-ă-rĭzm*, the act or practice of an incendiary. INCENDIARY SHELLS: see CARCASS.

INCENSANT, a. *ĭn-sĕn'sant* [L. *incenso*, a freq. from L. *incendo*, I burn]: in *her.*, a term applied to a boar when borne in a furious, angry position.

INCENSE, n. *in'sĕns* [L. *incensus*, set fire to, burnt: It. *incenso;* F. *encens*, incense—*lit.*, what is burnt]: the odors arising from certain spices, gums, etc., when thrown on fire, used in religious rites; the materials so burned; *figuratively*, the worship of prayer and praise: V. to perfume with incense. INCENSE, v. *ĭn-sĕns'*, to inflame with anger; to provoke; to exasperate. INCEN'SING, imp. INCENSED', pp. *-sĕnst'*. INCEN'SIVE, a. *-sĕn'sĭv*, tending to incense or provoke. INCENSE'MENT, n. in *OE.*, rage; fury; heat.—SYN. of 'incense, v.': to enrage; anger; irritate; fire; heat; in *OE.*, enkindle; inflame; perfume.

IN'CENSE: perfume (i.e. fumigation), the odor of which is evolved by burning, and the use of which, in public worship, prevailed in most of the ancient religions. The I. at present in use consists of some resinous base, such as gum olibanum, mingled with odoriferous gums, balsams, etc. There is no regular formula for it, almost every maker having his own peculiar recipe. The ingredients are usually olibanum, benzoin, styrax, and powdered cascarilla bark. These materials, well mingled, are so placed in the censer or thurible as to be sprinkled by falling on a hot plate, which immediately volatilizes them, and diffuses their odor through the edifice. See FRANKINCENSE, Among the Jews, the burning of I. was employed exclusively as an act of worship, and, indeed, appears to have been itself regarded as a sacred offering. The same appears in the religion of Egypt also; though the Persian sculptures exhibit the burning of I. as one of the marks of honor offered to royalty.

In the Rom. Cath. Church, and in the Eastern churches, I. is used in public worship, particularly in connection with the Eucharist service, which is regarded as a sacrafice; but writers are not agreed as to the earliest date at which its use can be traced. St. Ambrose, in the Western Church, alludes to I. in terms which suppose the practice of burning it to be an established one, and in later writers, it is mentioned familiarly as a part of ordinary public worship. In the Rom. Cath. Church, I. is used in the solemn (or high) mass, in the consecration of churches, in solemn consecrations of objects intended for use in public worship, and in the burial of the dead. There are also minor incensations of the celebrating bishop or priest and inferior ministers; of prelates, princes, and other dignitaries officially present at the public service, and a general incensation of the whole congregation.

In the Reformed churches, the use of incense was gradually abandoned after the reign of Edward VI. with other practices which have been laid aside by them as without 'warrant of Scripture.' In the Church of England, it has never been abolished by law, and in the recent ritualistic revival in that Church and in the Prot. Episc. Church in the United States, its use has in a few instances been restored.

INCENSED′, or ANIMÉ, in Heraldry: epithet applied to panthers or other wild beasts borne with flames issuing from their mouths and ears.

INCENTIVE, a. *ĭn-sĕn′tĭv* [mid. L. *incentīvus*, that sings or sounds to, that stirs up or incites—from L. *incĭnō*, I sing or make music to: It. *incentivo*]: inciting; encouraging: N. that which kindles or excites; that which prompts to good or evil; a stimulus. INCEN′TIVELY, ad. *-lĭ*.—SYN. of 'incentive, n.': motive; spur; incitement; encouragement.

INCEPTION: see under INCEPTIVE.

INCEPTIVE, a. *ĭn-sĕp′tĭv* [L. *inceptum*, a beginning—from *in*, into; *captus*, taken: It. *incepto*, begun]: beginning; denoting beginning; applied to a verb which expresses the beginning of an action, or of a course of action. INCEP′TIVELY, ad. *-lĭ*. INCEP′TOR, n. *-tėr* [L. a beginner]: a beginner; one on the point of taking the academic degree of A.M. INCEPTION, n. *ĭn-sĕp′shŭn*, beginning; commencement.

INCERTAIN, a. *ĭn-sėr′tĭn* [*in*, not, and *certain*]: in *OE.*, uncertain; doubtful. INCER′TAINTY, n. *-tĭn-tĭ*, uncertainty; doubtfulness.

INCERTITUDE, n. *ĭn-sėr′tĭ-tūd* [F. *incertitude*, uncertainty—from L. *incertĭtūdĭnem*—from *incertus*, uncertain—from *in*, not; *certus*, sure]: uncertainty; doubtfulness.

INCESSANT, a. *ĭn-sĕs'sănt* [F. *incessant*—from L. *incessan'tem:* It. *incessante;* Sp. *incesante,* incessant, continual—from L. *in,* not; *cessans,* ceasing or giving over]: continual; without interruption. **INCES'SANTLY**, ad. *-lĭ.*—SYN. of 'incessant': unceasing; unintermitted; uninterrupted; ceaseless; perpetual; constant.

INCEST, n. *ĭn'sĕst* [F. *inceste*—from L. *incestus,* unclean, unchaste—from *in,* not; *castus,* pure, chaste: It. *incesto*]: sexual intercourse within the prohibited degrees. **INCESTUOUS**, a. *ĭn-sĕs'tū-ŭs,* guilty of incest. **INCES'TUOUSLY**, ad. *-lĭ.* **INCES'TUOUSNESS**, n.

IN'CEST (Lat. *in,* not; *castus,* chaste): cohabitation between man and woman whose relation to each other by consanguinity or affinity is within the degrees where the laws prohibit marriage. The laws of Great Britain forbid the marriage of a man to his deceased wife's sister as incestuous, and for many years bills have been defeated in parliament by decreasing majorities to legalize such marriages. In the United States such marriages are of frequent occurrence and are not illegal. In Greal Britain, if a man cohabits with his deceased wife's sister without or with marriage, both are guilty of I., and the marriage is void. Cohabitation between parents and children, grandparents and grandchildren, and brothers and sisters of half or whole blood is incestuous in many of the United States, and marriage within these degrees is prohibited. Different state statutes forbid such marriages and declare the degrees of illegality. Some forbid cousins to marry, a prohibition not recognized in Europe, where royal families are continually intermarrying. I. is not a criminal offense in England, but it is criminal in nearly all of the United States. In N. Y. it is made a felony by statute, punishable by a maximum imprisonment of 10 years.

INCH, n. *ĭnsh* [AS. *ince,* an inch: L. *uncĭă,* the twelfth part of a pound]: the twelfth part of a foot; a measure; a small quantity or degree, as to die by *inches:* ADJ. measuring an inch, as a *two-inch* board; in *OE.*, an exact or nice point of time. **INCHED**, a. *ĭnsht,* containing inches. **INCHMEAL**, in *OE.*, a piece an inch long: AD. in *OE.*, by small degrees; by piecemeal.

INCH, n. *ĭnsh* [Ir. *inis;* Gael. *innis* and *insh,* an inclosure for cattle, an island—akin to L. *insŭlă,* an island]: in *Scot.*, a small island. Inch and Innis enter into many Scotch and Irish compound names, e.g., Inchcolm (q.v.), Inniskillen.

INCHARITABLE, a.: OE. for UNCHARITABLE.

INCH'COLM (of old, 'St. Colm's Inch,' as in Shakespeare's *Macbeth,* act i. sc. 2; in Lat. *Aemonia,* and *Insula Sancti Columbæ*): islet, beautifully situated in the Firth of Forth, within sight of Edinburgh. It is separated from the north or Fife shore by a channel less than a mile broad, called 'Mortimer's Deep.' The isle is somewhat more than half a mile in length, and less than a third of a mile broad where widest. In 1881, seven persons resided on it. It takes its name from St. Colm or Columba (q.v.) of Iona, who is said to have dwelt here while laboring for the conversion of the Northern Picts in the 6th c. In 1123, King Alexander I. of Scotland, being shipwrecked on it, found it inhabited by a solitary hermit, who lived on shell-fish and the milk of one cow, and served St. Columba in a little chapel or oratory. The king, in gratitude for his escape, founded on the island an abbey of Austin canons regular. Walter Bower, enlarger and continuator of the *Scotichronicon* of John of Fordun (q.v.), was abbot of the monastery 1418–49. It was repeatedly sacked by the English in the 14th, 15th, and 16th c. The buildings, long in ruins, show traces of Romanesque work (of about the middle of the 12th c.); but are chiefly First Pointed (of the 13th and 14th c). The tower has some resemblance to the tower of Iona. The oldest edifice is a little vaulted oratory (20 ft. long by 7 broad), believed to represent the chapel in which King Alexander found the anchorite serving St. Columba in the 12th c. It is of the same type as the Irish oratory of Gallerus. It has been lately restored. There is also a chapter-house with a groined roof, and three elegant sedilia. The history of I. has been written with great detail by Prof. Sir James Y. Simpson, *Proceedings of the Antiquaries of Scotland,* II. 489–528.

INCHKEITH, *ĭnch-kēth'*: island in the Firth of Forth, nearly midway between Leith and Kinghorn. It is a mile in length, and not much more than a third of a mile broad where widest. Pop. (1871) only 9: (1881) 75. It is believed to be the site of the town or stronghold of Giudi, described by Bede (who wrote about 731) as situated in the middle of the great arm of the sea which runs into Britain from the east (that is, the Firth of Forth). From the island fortress of Giudi, the inlet in which it stood was of old called 'the sea of Giudin,' and hence also, probably, I. took its name. The island is said to have been the site of a church or monastery, founded between 679 and 704 by St. Adamnan, biographer of St. Columba, and his successor in the abbacy of Iona. I. was seized by the English 1547, when they built a fort, which, 1549, was taken by the French auxiliaries of Scotland, who gave the island the name of the 'Isle of Horses.' A light-house was built on the site of the fort 1804. New and extensive fortifications were begun by the government 1878. The island, which belongs to the Duke of Buccleuch, is part of the parish of Kinghorn, in Fife.

INCHOATE, a. *ĭn'kō-āt* [L. *inchŏātus,* founded, begun]: begun; entered upon; incipient: V. to begin; to commence. IN'CHOATING, imp. IN'CHOATED, pp. IN'CHOATE'LY, ad. *-lĭ.* IN'CHOA'TION, n. *-ā'shŭn,* the act of beginning. IN'CHOA'TIVE, a. *-tĭv* [F. *inchoatif*]: expressing or indicted ing beginning.

INCIDENCE, n. *ĭn'sĭ-dĕns* [F. *incidence*—from L. *incĭdens,* or *incĭden'tem,* a falling in or on—from *in,* in; *cadens,* falling]: a falling on or occurring; the direction in which any elastic body, or light or heat, falls on or strikes another; accessories or matters, however remote, occurring in connection with a thing apart from its main design, as the *incidence* of a tax—for example, a tax may not really be paid by the person from whom it is actually received, as a tax on rents paid by landowners is really included in the rents exacted, or a tax may operate unequally or unfairly. ANGLE OF INCIDENCE, the angle formed by a ray, as of light or heat, striking or impinging on a surface, and which angle is equal to the *angle of reflection:* see ANGLE: CATOPTRICS. IN'CIDENT, n. *-dĕnt* [F.—L.]: something which happens beside the main design; a circumstance; an occurrence; an adventure: ADJ. falling into or upon; liable to occur; casual. IN'CIDEN'TAL, a. *-dĕn'tăl,* coming without design; issuing or happening apart from the main design; happening by chance; casual; occasional; not intended. INCIDEN'TALS, n. plu. things coming or happening without design. IN'CIDEN'TALLY, ad. *-lĭ,* beside the main design; occasionally. IN'CIDENCY, n. *-dĕn-sĭ,* in *OE.*, a falling on or occurring; a casualty; incidence. INCIDENT DILIGENCE, term in Scotch law for letters issued to compel attendance of witnesses; similar to subpœna (q.v.).—SYN. of 'incident, a.': falling on; fortuitous; occasional; liable; accidental;—of 'incident, n.': event; fact; casualty; chance; accident; contingency;—of 'incidental': fortuitous; contingent; accidental.

INCINERATE, v. *ĭn-sĭn'ėr-āt* [mid. L. *incĭnĕrātus;* It. *incenerare,* to reduce to ashes—from L. *in,* into; *cinis,* or *cinĕrem,* ashes]: to burn to ashes. INCIN'ERATING, imp. INCIN'ERATED, pp. INCIN'ERA'TION, n. *-ā'shŭn* [F.—L.]: the act of burning or reducing to ashes. *Note.—Calcination* is the process of reducing to a calx or friable state by heat.

INCIPIENT, a. *ĭn-sĭp'ĭ-ĕnt* [L. *incĭpĭen'tem,* taking in hand, beginning—from *in,* in; *căpĭō,* I take: It. *incipiente,* incipient]: beginning; commencing. INCIP'IENTLY, ad. *-lĭ.* INCIP'IENCY, n. *-ĕn-sĭ,* commencement.

INCISE, v. *ĭn-sīz'* [F. *inciser,* to cut in, to incise—from L. *incīsus,* cut into—from *in, cædĕrĕ,* to cut]: to cut in or into; to carve; to engrave. INCI'SING, imp. INCISED', pp. *-sīzd':* ADJ. cut down deeply; cut in. INCI'SOR, n. *-sī'zėr,* one of the cutting or fore teeth; a cutter. INCISION, n. *ĭn-sĭzh'ŭn* [F.—L.]: the act of cutting into a substance; a cut; a gash. INCISIVE, a. *ĭn-sī-sĭv* [F. *incisif*]: also INCI'SORY, a. *-zėr-ĭ,* having the quality of cutting; situated near the incisor teeth, or relating to them. INCI'SIVE, a. that cuts into; that strikes into, opens up, and makes clear; sharp; trenchant; sarcastic. INCISURE, n. *ĭn-sĭzh'ôr* [L. *incīsūră,* a cutting into]: a cut; an incision. INCISIVE-BONES, n. the bones of the upper jaw containing the incisors; the premaxillary bones.

INCITE, v. *ĭn-sīt'* [F. *inciter*—from L. *incĭtārĕ,* to urge on—from *in,* into; *citārĕ* to put into quick motion: It. *incitare*]: to rouse or move the mind to action; to spur on; to encourage or instigate. INCI'TING, imp. INCI'TED, pp.

INCI'TER, n. one who. INCITATION, n. *ĭn'sĭ-tā-shŭn* [F.—L.]: the act of inciting; that which excites to action; motive; incentive. INCITE'MENT, n. *-mĕnt* [F.—L.]: that which moves to action; impulse. INCI'TINGLY, ad. *-lĭ.*—SYN. of 'incite': to excite; arouse; awaken; stimulate; instigate; spur; goad; urge; provoke; encourage; prompt; animate;—of 'incitement': motive; encouragement; incentive; spur; stimulus.

INCIVIL, a. *ĭn-sĭv'ĭl* [F. *incivil*—from L. *incivīlĭs,* rude, uncivil—from *in,* not; *cīvĭs,* a citizen]: in *OE.*, uncivil; rude. INCIVILITY, n. *ĭn'sĭ-vĭl'ĭ-tĭ* [F. *incivilité*—from L. *in,* not; *civīlĭtas,* courtesy, humanity]: want of courtesy; rudeness of manners; any act of ill-breeding. INCIVIL'ITIES, n. plu. *-ĭ-tĭz,* acts of discourtesy.—SYN. of 'incivility': discourtesy; impoliteness; disrespect; uncourteousness; rudeness; unmannerliness.

INCIVISM, n. *ĭn-sī'vĭzm* [F. *incivisme,* want of patriotism—from L. *in,* not; *cīvĭcus,* pertaining to citizens—from *cīvĭs,* a citizen]: want of patriotism; want of love of one's country.

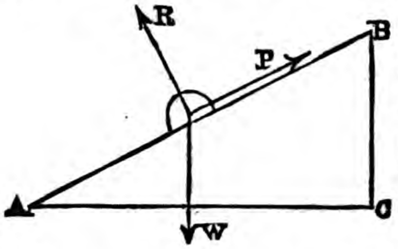
INCLAUDENT, a. *ĭn-klaw'dĕnt* [prefix *in,* not; L. *claudo,* I close]: in *bot.*, not closing.

INCLAVATED, a. *ĭn'klă-vā-tĕd* [L. *in,* into; *clāvŭs,* a nail or spike]: locked in; fast fixed. INCLAVE, a. *ĭn'klāv,* dovetailed; resembling a dovetailed joint.

INCLEMENT, a. *ĭn-klĕm'ĕnt* [F. *inclément*—from L. *inclēmen'tem,* unmerciful, severe—from *in,* not; *clemens,* mild, gentle: It. *inclemente*]: harsh; unpitying; rough; stormy. INCLEM'ENTLY, ad. *-lĭ.* INCLEM'ENCY, n. *-ĕn-sĭ* [F. *inclémence*]: roughness; storminess; harshness; severity; want of tenderness or mercy. *Note.*—INCLEMENT and INCLEMENCY are now generally restricted in their application to the weather.

INCLINE, v. *ĭn-klīn'* [F. *incliner*—from L. *inclīnārĕ,* to bend or bow in any direction—from *in,* into; L. *clino;* Gr. *klinō,* I bend or lean: comp. Gael. *claon,* oblique, to go wrong]: to bend; to lean from an erect or parallel line; to slope; to be disposed; to turn the desire towards: N. a slope; a gradient, as of a railway. INCLI'NING, imp: ADJ. leaning; sloping. INCLINED', pp. *-klīnd':* ADJ. deviating or leaning from the perpendicular; sloping; disposed. INCLI'NER, n. *-nėr,* one who or that which inclines. INCLI'NABLE, a. *-nă-bl,* leaning; tending; favorably disposed. INCLI'NABLENESS, n. *-bl-nĕs.* INCLINATION, n. *ĭn'klĭ-nā'shŭn* [F.—L.]: a bending or sloping either downwards or upwards; the direction of one body with respect to another when measured by the angle formed at the point of meeting; tendency or leaning towards; bias of mind or will; propensity; desire; love. IN'CLINOM'ETER, n. *-nŏm'ĕ-tėr* [Gr. *metron,* a measure]: an instrument for measuring the vertical elements of the magnetic force.—SYN. of 'inclination': deviation from; bent; a leaning; bias; turn; tendency; proneness; disposition; prepossession; predilection; attachment; affection; regard.

INCLINED′ PLANE, The: a sloping surface, as on a road, or as the side of a knife-blade; reckoned one of the five Mechanical Powers (q.v.), because, by its aid operations may be performed which would be difficult or impossible without it: e.g. a man may roll up a plane a weight which he could not lift. This principle is extensively applied, in cutting, in splitting, and chiefly in the raising of weights and in road-making. For a mathematical investigation of the theory of the I. P., see the common books on mechanics; the result is as follows: The force required to lift a body (viz., its weight) bears to the force required to keep it from rolling down an I. P., the same proportion that the length of the I. P. bears to its height; also the weight of the body bears to the weight which tends to bend or break the I. P., the same proportion that the length of the plane bears to its base. Let us suppose an I. P. whose length, AB, is 13 ft.; base, AC., 12 ft.; and height, BC, 5 ft.; and let the weight be 780 lbs. Then the force P, which can sustain 780 lbs. on the I. P., is $\frac{5}{13}$ of 780, or 300 lbs. (i.e., a force which would just lift 300 pounds); also the force R. which presses perpendicularly on the plane, is $\frac{12}{13}$ of 780, or 720 pounds. When the weight has not only to be sustained on the plane but also drawn up it, the resistance of friction (q.v.) has to be added to the power necessary to sustain the weight. In common roads, engineers are agreed that the height of an incline should not exceed $\frac{1}{20}$ of the length, or, as they phrase it, the *gradient* should not be greater than one in 20. Knives, chisels, axes, wedges, and screws, are merely modifications of the inclined plane; but for the last two, generally classed as distinct mechanical powers, see the respective titles.



INCLOSE, v. *ĭn-klōz′*, or **Enclose′** [*in*, into, and *close:* F. *enclos*, an inclosure; *inclus*, inclosed—from L. *inclūsŭs;* It. *incluso*, inclosed, shut up]: to shut in; to confine on all sides; to cover with a wrapper or envelope; to separate land by a fence. **Inclo′sing**, imp. **Inclosed′**, pp. *-klōzd′:* **Adj.** surrounded; confined on all sides; covered, as with a case or envelope. **Inclo′sure**, n. *-klō′zhûr*, the act of inclosing; a space shut in, or separated from others; that which is contained in a wrapper or envelope. **Inclo′ser**, n. one who or that which incloses.—**Syn.** of 'inclose': to limit; bound; circumscribe; restrict; include; surround; environ; encompass; confine; restrain; encircle; envelop.

INCLUDE, v. *ĭn-klôd′* [L. *inclūdĕrĕ*, to shut up or in—from *in*, in; *claudo*, I shut: It. *includere*, to inclose]: to contain; to comprise; to comprehend. **Inclu′ding**, imp. **Inclu′ded**, pp.: **Adj.** in *bot*, applied to the stamens when inclosed within the corolla, and not pushed out beyond its tube. **Inclusion**, n. *ĭn-klô′zhŭn* [L. *inclūsĭōnem*, a shutting up]: the act of including. Inclu'sive, a. *-sĭv*, comprehended in the number or sum; in *OE.*, inclosing; encircling. Inclu'sively, ad. *-lĭ*, in a manner so as to include.—Syn. of 'include': to embrace; imply; involve; hold.

INCLUSA, n. *ĭn-klô'sa* [L. *includo*, I shut in]: in *zool.*, in Cuvier's classification, the fifth family of *Testaceous Acephala.* It consisted of bivalve mollusks, with a double tube projecting from the gaping shell.

INCOAGULABLE, a. *ĭn'kō-ăg'ū-lă-bl* [L. *in*, not, and *coagulable*]: that cannot be coagulated.

IN CŒ'NA DO'MINI [Lat. *At the Lord's Supper*, so called from the ancient day of its annual publication, Holy Thursday, the anniversary of the institution of the Supper]: celebrated papal bull. It is not, as other bulls, the work of a single pope, but with additions and modifications at various times, dates from the middle ages; some writers tracing it to Martin V., some to Clement V., others to Boniface VIII. Its present form it received from Popes Julius II., Paul III., and finally Urban VIII., 1627, from which year it continued for a century and a half to be published annually on Holy Thursday, or on Easter Monday. The contents of this bull have been a fertile subject of controversy. It was a summary of ecclesiastical censures, especially of those with which grievous violation of the faith of the church, or of the rights of the church or of the Roman see are visited; excommunication being denounced against Wickliffites, Hussites, Lutherans, and all guilty of heresy, schism, sacrilege, usurpation of the rights of the church or of the pope, forcible and unlawful seizure of church property, personal violence against ecclesiastics, unlawful interruption of the free intercourse of the faithful with Rome, etc. The bull, though mainly dealing with offenses against the church, denounces under similar censures other crimes, e.g., piracy, plunder of shipwrecked goods, forgery, etc. This bull, being regarded by most of the crowned heads of Europe as an infringement of their rights, encountered in the 17th c. the determined opposition of nearly all the courts, even those most favorable to Rome; and at length, 1770, Clement XIV. discontinued its publication, which has never since been renewed.

INCOG, ad. *ĭn-kŏg'* [L. *incog'nĭtus*, unknown—from *in*, not; *cognĭtus*, known: It. *incognito*, unknown]: the contracted form of Incognito, ad. *ĭn-kŏg'nĭ-tō*, in disguise; privately; in concealment.

INCOGNIZABLE, a. *ĭn-kŏg'nĭ-ză-bl* or *ĭn-kŏn'ĭ-ză-bl* [*in*, not, and *cognizable*]: that cannot be known or distinguished.

INCOHERENT, a. *ĭn'kō-hē'rĕnt* [F. *incohérent*—from mid. L. *incohæren'tem* from L. *in*, not; *cohærērĕ*, to be united, to adhere]: not being united; loose; unconnected; having no dependence of one part on another, as the speech of a madman. In'cohe'rence, n. *-rĕns* [F.—L.]: or In'cohe'rency, n. *-sĭ*, looseness of material parts; want of connection; incongruity; the want of dependence of one part upon another. IN'COHE'RENTLY, ad. *-lĭ.*—SYN. of 'incoherent': incongruous; inconsistent; incompatible.

INCOMBUSTIBLE, a. *in'kŏm-bŭs'tĭ-bl* [F. *incombustible*—from L *in*, not; mid. L. *combustĭb'ĭlĭs*, combustible (see COMBUSTIBLE)]: that cannot be burnt or consumed by fire. IN'COMBUS'TIBLY, ad. *-tĭ-blĭ.* IN'COMBUS'TIBLENESS, n. *-bl-nĕs*, also IN'COMBUS'TIBIL'ITY, n. *-bĭl'ĭ-tĭ*, the quality of not being able to be burnt.—*Incombustible Fabrics* have of late years been somewhat sought for, as a protection from death or injury by ignition of clothing, though the search after some means of rendering garments incombustible dates from a very early period (see Beckmann's *History of Inventions*). After many attempts by Gay-Lussac and other chemists, Messrs. Versmann and Oppenheim communicated to the British Assoc. at Aberdeen, 1859, the results of a series of experiments for rendering linen, calico, muslin, and all other vegetable fibres uninflammable. Silks, worsteds, and animal fibres may be ignited and charred, but they do not burst into flame, because the gases they yield are not inflammable; vegetable fibres, on the other hand, largely evolve carburretted hydrogen. These experimenters found that many salts possessed this power, but that some of these injured the fabric, spoiled the color, or were too expensive for general use. Two, however, tungstate of soda and sulphate of ammonia, produced the best results without injuring the tissue or color of the fabric. The first of these acts physically by preventing contact with the air, and does not interfere with the processes of ironing and starching; it is therefore preferable for goods requiring washing. The best method of applying it is by mixing in the proportion of 4 ounces of tungstate of soda to 1 dram of phosphate of soda (to prevent the formation of a partially insoluble bitungstate), and dissolving the whole in an imperial pint of water. For fabrics which are worn without previous washing, sulphate of ammonia is preferable, and a solution containing 7 per cent. of the crystalline salt is a perfect preservative. In printed muslins of a madder purple, a slight paleness of color is produced, but in no other case is the color affected, nor does it interfere with the ironing process. The incombustible fabrics of the ancients were of Asbestos (q.v.).

INCOME, n. *ĭn'kŭm* [*in*, into, and *come*]: that which comes in from labor or business; gain, profit, or interest, as from labor, business, or property; a stipend; revenue. IN'COMING, a. coming in. IN'COMINGS, n. plu. *-ĭngz*, receipts; gains. INCOMING TENANT, one who succeeds another, as in a house or a farm.

IN'COME-TAX: tax on all persons having incomes above a certain amount, whether from lands or labor. In Britain, various acts have passed from time to time to impose this tax—the first introduced by Pitt, and revived, 1842 by Sir Robert Peel, since which date it has been continued—the fairness and public policy of which have given rise to long controversy. Incomes below £100 are exempt. It is said that one-sixth of the British revenue is from the

I.-T. This kind of tax is unpopular in Britain and the United States. In the United States there was an I.-T., under the pressure of the great war-debt, from 1863 to the end of 1871, when it was abolished. Incomes of $600 and less were exempt; later, of $1,000 and less; still later of $2,000 and less. The rate was, on incomes under $5,000, 5 per cent.; $5,000 to $10,000, 7 per cent.; above $10,000, 10 per cent. In 1870, $26,153,000 was thus raised. See TAXATION.

IN COMMENDAM, *ĭn kŏm-mĕnd'ăm* [L. into trust]: a vacant church living, as intrusted to the charge of a qualified person till it can be supplied with an incumbent.

INCOMMENSURABLE, a. *ĭn'kŏm-mĕn'sū-ră-bl* [F. *incommensurable*—from L. *incommensūrābĭlĭs: in*, and Eng. *commensurable*]: having no common measure or standard of comparison, as the side of a square and its diagonal. IN'COMMEN'SURABLES, n. plu. *-ră-blz*, applied to quanties. IN'COMMEN'SURABLY, ad. *-blĭ*. IN'COMMEN'SURABIL'ITY, n. *-bĭl'ĭ-tĭ* [F. *incommensurabilité*]: quality or state of being incommensurable. IN'COMMEN'SURATE, a. *-sū-rāt* [*in*, not, and *commensurate*]: not admitting of a common measure; not adequate; insufficient. IN'COMMEN'SURATELY, ad. *-lĭ*.

INCOMMEN'SURABLE MAG'NITUDES, or INCOMMEN'SURABLE QUAN'TITIES: those which have no common measure, i.e., are not, both of them, multiples of the same unit, however small that unit be taken. Examples of I. M. are abundant in mathematical science: Thus, the side and diagonal of a square; the diameter and circumference, or diameter and area of a circle, etc.; 2 and $\sqrt{3}$; $\sqrt{5}$ and $\sqrt{7}$, etc. I. M. in arithmetic denotes two numbers which have no common measure greater than unity.

INCOMMISCIBLE, a. *ĭn'kŏm-mĭs'sĭ-bl* [L. *in*, not; *con*, together; *miscĕō*, I mix]: that cannot be mixed together.

INCOMMODE, v. *ĭn'kŏm-mōd'* [F. *incommode*, inconvenient, troublesome—from L. *incommŏdus*, inconvenient, unsuitable—from *in*, not; *commŏdus*, complete, perfect, fit—from *mŏdus*, a measure: It. *incommodo*]: to give trouble to; to disturb or disquiet without any great injury. IN'COMMO'DING, imp. IN'COMMO'DED, pp. IN'COMMO'DIOUS, a. *-dĭ-ŭs*, inconvenient; giving trouble without much injury. IN'COMMO'DIOUSLY, ad. *-lĭ*. IN'COMMO'DIOUSNESS, n.—SYN. of 'incommode': to inconvenience; disturb; annoy; molest; trouble; worry; disquiet; vex; embarrass.

INCOMMUNICABLE, a. *ĭn'kŏm-mū'nĭ-kă-bl* [F. *incommunicable*—from mid. L. *incommunicab'ĭlĭs: in*, not, and *communicable*]: that cannot be imparted or revealed to others. IN'COMMU'NICABLY, ad. *-kă-blĭ*. IN'COMMU'NICABLENESS, n. *-kă-bl-nĕs*, or IN'COMMU'NICABIL'ITY, n. *-bĭl'ĭ-tĭ*. IN'COMMU'NICATING, imp. having no intercourse with each other. IN'COMMU'NICATED, pp. *-kā-tĕd*, not imparted. IN'COMMU'NICATIVE, a. *-tĭv*, not free or apt to impart to others in conversation.

INCOMMUTABLE, a. *ĭn'kŏm-mū'tă-bl* [F. *incommutable*—from mid. L. *incommutābĭlĭs: in*, not, and Eng. *com-*

mutable]: not to be exchanged or commuted with another. IN'COMMU'TABLY, ad. *-blĭ.* IN'COMMU'TABIL'ITY, n. *-bĭl'ĭ-tĭ* [F. *incommutabilité*]: or IN'COMMU'TABLENESS, n. *-bl-nĕs,* unchangeableness.

INCOMPARABLE, a. *ĭn-kŏm'pă-ră-bl* [F. *incomparable*—from mid. L. *incomparābĭlĭs: in,* not, and Eng. *comparable*]: that admits of no comparison with others; without peer or equal. INCOM'PARABLY, ad. *-ră-blĭ,* beyond comparison; without competition. INCOM'PARABLENESS, n. *-bl-nĕs,* excellent beyond comparison.

INCOMPATIBLE, a. *ĭn'kŏm-păt'ĭ-bl* [F. *incompatible: in,* not, and Eng. *compatible*]: that cannot subsist with something else; in *phar.*, term used of medicines not suitable to be prescribed together, because one would counteract the effect of the other; in *chem.*, one of two or more salts or other substances which cannot be united in solution without decomposition or chemical change. IN'COMPAT'IBLY, ad. *-blĭ.* IN'COMPAT'IBLENESS, n. *-bl-nĕs,* or IN'COMPAT'IBIL'ITY, n. *-bĭl'ĭ-tĭ* [F. *incompatibilité*]: irreconcilable disagreement. IN'COMPAT'IBLES, n. plu. *-ĭ-blz,* in *chem.*, salts or compounds which decompose each other when brought in contact in solution. INCOMPATIBLE-TERMS, in *logic,* terms which cannot be affirmed of the same subject.—SYN. of 'incompatible': incongruous; inconsistent; incoherent; dissimilar; discordant; irreconcilable; repugnant; contradictory.

INCOMPETENT, a. *ĭn-kŏm'pĕ-tĕnt* [F. *incompétent*—from mid. L. *incompĕten'tem: in,* not, and Eng. *competent*]: wanting adequate powers of mind, or suitable faculties; wanting the legal ability. INCOM'PETENTLY, ad. *-lĭ.* INCOM'PETENCE, n. *-tĕns* [F.—L.], or INCOM'PETENCY, n. *-tĕn-sĭ,* want of sufficient powers; inability.—SYN. of 'incompetent': incapable; inadequate; insufficient; unable; improper; unfit; disqualified.

INCOMPLETE, a. *ĭn'kŏm-plēt'* [F. *incomplet*—from mid. L. *incomplētus: in,* not, and Eng. *complete*]: not finished; imperfect; defective; in *bot.*, destitute of some organ. IN'COMPLETE'LY, ad. *-lĭ.* IN'COMPLETE'NESS, n. imperfection; unfinished state.

INCOMPLEX, a. *ĭn'kŏm-plĕks'* [F. *incomplexe,* simple, incomplex—from mid. L. *incomplex'us: in,* not, and Eng. *complex*]: uncompounded; simple.

INCOMPLIABLE, a. *ĭn'kŏm-plī'ă-bl* [*in,* not, and *compliable*]: not compliable. IN'COMPLI'ANT, a. *-plī'ănt* [*in,* not, and *compliant*]: not disposed to comply or yield to solicitation. IN'COMPLI'ANCE, n. *-plī'ăns,* want of compliance.

INCOMPOSED, a. *ĭn'kŏm-pōzd'* [*in,* not, and *composed*]: in *OE.*, discomposed; disordered; disturbed.

INCOMPREHENSIBLE, a. *ĭn-kŏm'prĕ-hĕn'sĭ-bl* [F. *incomprehensible*—from mid. L. *incomprĕhensĭb'ĭlĭs: in,* not, and Eng. *comprehensible*]: that cannot be understood; beyond the reach of human intellect. INCOM'PREHEN'SIBLY, ad. *-blĭ.* INCOM'PREHEN'SIBLENESS, n. *-bl-nĕs,* or

INCOM'PREHEN'SIBIL'ITY, n. *-bĭl'ĭ-tĭ* [F. *incompréhensibilité*]: the quality of being beyond the reach of human intellect. INCOM'PREHEN'SION, n. *-shŭn* [F.—L.]: want of comprehension or understanding. INCOM'PREHEN'SIVE, a. *-sĭv*, not capable of including or understanding; not extensive.

INCOMPRESSIBLE, a. *ĭn'kŏm-prĕs'sĭ-bl* [F. *incompressible*—from mid. L. *incompressĭb'ĭlĭs: in*, not, and Eng. *compressible*]: not capable of being reduced by force to a smaller compass. IN'COMPRES'SIBIL'ITY, n. *-bĭl'ĭ-tĭ.*

INCOMPUTABLE, a. *ĭn'kŏm-pū'tă-bl* [*in*, not, and *computable*]: that cannot be reckoned.

INCONCEIVABLE, a. *ĭn'kŏn-sēv'ă-bl* [F. *inconcevable: in*, not, and Eng. *conceivable*]: that cannot be imagined; incomprehensible. IN'CONCEIV'ABLY, ad. *-blĭ.* IN'CONCEIV'ABLENESS, n. *-bl-nĕs*, quality or state of being inconceivable; incomprehensibility.

INCONCLUSIVE, a. *ĭn'kŏn-klô'zĭv* [L. *in*, not, and *conclusive*]: not closing or settling a point in debate or a doubtful question; not exhibiting cogent or satisfactory evidence. IN'CONCLU'SIVELY, ad. *-lĭ.* IN'CONCLU'SIVENESS, n. want of such evidence as would satisfy the mind.

INCONCUSSIBLE, a. *ĭn'kŏn-kŭs'sĭ-bl* [L. *in*, not, and *concussible*]: that cannot be shaken.

INCONDENSABLE, a. *ĭn'kŏn-dĕn'să-bl* [L. *in*, not, and *condensable*]: that cannot be reduced to a less compass, or converted from a gas or vapor to a liquid or solid. IN'CONDEN'SABLY, ad. *-blĭ.* IN'CONDEN'SABIL'ITY, n. *-bĭl'ĭ-tĭ.*

INCONGEALABLE, a. *ĭn'kŏn-jēl'ă-bl* [L. *in*, not, and *congealable*]: not capable of being frozen. IN'CONGEAL'ABLENESS, n. *-bl-nĕs.*

INCONGRUENT, a. *ĭn-kŏn'grô-ĕnt* [L. *incongrŭen'tem*, inconsistent, unsuitable: It. *incongruo* and *incongruente*, incongruous: F. *incongru*]: unsuitable; inconsistent. IN'CONGRU'ITY, n. *-grô'ĭ-tĭ* [F. *incongruité*]: unsuitableness; absurdity; inconsistency; disagreement of parts. INCON'GRUOUS, a. *-kŏn'grô-ŭs* [L. *incongrŭŭs*]: unsuitable; not fitting; improper. INCON'GRUOUSLY, ad. *-lĭ.*—SYN. of 'incongruous': incoherent; inconsistent; incompatible; unsuited; inappropriate; unfit.

INCONSEQUENT, a. *ĭn-kŏn'sĕ-kwĕnt* [F. *inconséquent*—from mid. L. *inconsĕquen'tem*, not logically consequent—from L. *in*, not; *con*, together; *sequor*, I follow: It *inconsequente*]: not following from the premises. INCON'SEQUENCE, n. *-kwĕns* [F.]: want of logical sequence or just inference. INCON'SEQUEN'TIAL, a. *-kwĕn'shăl*, not regularly following from the premises; of little moment. INCON'SEQUEN'TIALLY, ad. *-lĭ.*

INCONSIDERABLE, a. *ĭn'kŏn-sĭd'ér-ă-bl* [*in*, not, and *considerable*]: not worthy of notice or consideration; unimportant; small; trivial. IN'CONSID'ERABLY, ad. *-blĭ.* IN'CONSID'ERABLENESS, n. *-bl-nĕs.*

INCONSIDERATE, a. *ĭn'kŏn-sĭd'ėr-āt* [L. *inconsidĕrātus*, unconsidered, thoughtless—from *in*, not; *consīdĕrō*, I look at closely]: hasty; rash; thoughtless; not attending to circumstances. IN'CONSID'ERATELY, ad. *-lĭ*. IN'CONSID'ERATENESS, n., or IN'CONSID'ERA'TION, n. *-ā'shŭn* [F.—L.]: thoughtlessness; negligence; inattention.—SYN. of 'inconsiderate': inattentive; inadvertent; careless; hasty; heedless; negligent; imprudent; improvident; incautious; indiscreet; injudicious.

INCONSISTENT, a. *ĭn'kŏn-sĭs'tĕnt* [*in*, not, and *consistent*]: being contrary at different times; not suitable; contradictory. IN'CONSIS'TENTLY, ad. *-lĭ*. IN'CONSIS'TENCE, n. *-tĕns* [F. *inconsistance*], or IN'CONSIS'TENCY, n. *-tĕn-sĭ*, self-contradiction; want of uniformity; want of attention to circumstances or consequences.—SYN. of 'inconsistent': incongruous; irreconcilable; discordant; repugnant; incompatible.

INCONSOLABLE, a. *ĭn'kŏn-sō'lă-bl* [F. *inconsolable*—from L. *inconsōlābĭlĭs: in*, not, and Eng. *consolable*]: not to be consoled; grieved beyond measure. IN'CONSO'LABLY, ad. *-blĭ*.

INCONSONANT, a. *ĭn-kŏn'sō-nănt* [*in*, not, and *consonant*]: not agreeing; discordant. INCON'SONANTLY, ad. *-lĭ*. INCOON'SONANCE, n. *-năns*, or INCON'SONANCY, n. *-năn-sĭ*, disagreement.

INCONSPICUOUS, a. *ĭn'kŏn-spĭk'ū-ŭs* [*in*, not, and *conspicuous*]: hardly discernible; not to be perceived by the sight. IN'CONSPIC'UOUSLY, ad. *-lĭ*.

INCONSTANT, a. *ĭn-kŏn'stănt* [F. *inconstant*—from mid. L. *inconstăn'tem: in*, not, and Eng. *constant*]: fickle; subject to sudden changes in opinions or purposes. INCON'STANCY, n. *-stăn-sĭ*, fickleness, as of temper or affection; unsteadiness. INCON'STANTLY, ad. *-lĭ*.—SYN. of 'inconstant': volatile; mutable; changeable; variable; versatile; unsteady; unstable; capricious.

INCONSUMABLE, a. *ĭn'kŏn-sū'mă-bl* [*in*, not, and *consumable*]: that cannot be wasted or consumed. IN'CONSU'MABLY, ad. *-blĭ*.

INCONTESTABLE, a. *ĭn'kŏn-tĕs'tă-bl* [*in*, not, and *contestable:* F. *incontestable*]: too clear to be questioned; not admitting of dispute; undeniable. IN'CONTES'TABLY, ad. *-blĭ*.—SYN. of 'incontestable': indisputable; unquestionable; incontrovertible; irrefragable; indubitable.

INCONTINENT, a. *ĭn-kŏn'tĭ-nĕnt* [F. *incontinent*—from L. *incontĭnen'tem*, not retaining, immoderate: It. *incontinente: in*, not, and Eng. *continent*]: not restraining the passions; unchaste; unable to restrain natural discharges. INCON'TINENCE, n. *-nĕns* [F.—L.], or INCON'TINENCY, n. *-nĕn-sĭ*, want or restraint of the passions—especially of the sexual appetite; inability to restrain discharge. INCON'TINENTLY, ad. *-lĭ*.

INCONTROLLABLE, a. *ĭn'kŏn-trōl'lă-bl* [*in*, and *controllable*]: not to be controlled; incapable of being restrained; uncontrollable.

INCONTROVERTIBLE, a. *ĭn-kŏn'trō-vėr'tĭ-bl* [L. *in*, not, and *controvertible*]: too clear or certain to admit of dispute. INCON'TROVER'TIBLY, ad. *-blĭ*. INCON'TROVER'TIBIL'ITY, n. *-bĭl'ĭ-tĭ*.—SYN. of ‘incontrovertible’: see under INCONTESTABLE.

INCONVENIENCE, n. *ĭn'kŏn-vēn'yĕns*, or IN'CONVEN'IENCY, n. *-yĕn-sĭ* [F. *inconvenient*—from mid. L. *inconvĕnĭen'tem: in*, and Eng. *convenience*]: that which troubles or incommodes; anything that disturbs or impedes: V. to trouble; to cause uneasiness to. IN'CONVEN'IENCING, imp. IN'CONVEN'IENCED, pp. *-yĕnst*. IN'CONVEN'IENT, a. *-yĕnt*, incommodious; unsuitable; giving trouble or uneasiness to; unfit. IN'CONVE'NIENTLY, ad. *-lĭ*.—SYN. of ‘inconvenience n.’: disturbance; annoyance; trouble; incommodiousness; disquiet; disadvantage; uneasiness; molestation ; unfitness; unsuitableness; inexpedience.

INCONVERTIBLE, a. *ĭn'kŏn-vėr'tĭ-bl* [*in*, not, and *convertible*]: that cannot be changed into something else. IN'CONVER'TIBLY, ad. *-blĭ*. IN'CONVER'TIBIL'ITY, n. *-bĭl'ĭ-tĭ*, the quality of not being changeable into something else.

INCONVINCIBLE, a. *ĭn'kŏn-vĭn'sĭ-bl* [*in*, and *convincible*]: that cannot be convinced; not capable of conviction. IN'CONVIN'CIBLY, ad. *-blĭ*.

INCONY, a. *ĭn-kō'nĭ* [probably from L. *in*, not; AS. *con*, to know: comp. Scot. and prov. Eng. *canny*, cautious, prudent, pretty, skilled in magic arts]: in *OE.*, pretty; innocent; artless; fine; delicate.

INCORPORATE, v. *ĭn-kŏr'pō-rāt* [*in*, into, and *corporate*: L. *in*, into; *corpŏrātŭs*, furnished with a body: F. *incorporer;* It. *incorporare*, to incorporate]: to work one mass or body into another; to unite; to blend; to form into a corporation or body politic; to unite so as to make part of another body; to embody: ADJ. mixed together; associated. INCOR'PORATING, imp. INCOR'PORATED, pp.: ADJ. associated; united in a legal body. INCOR'PORA'TION, n. *-shŭn* [F.—L.]: union of different ingredients into one mass; an association constituted by the legislature; formerly in Britain, by grant of the crown: see CORPORATION.

INCORPOREAL, a. *ĭn'kŏr-pō'rē-ăl* [*in*, not, and *corporeal*]: not consisting of matter; immaterial; spiritual. IN'CORPO'REALLY, ad. *-lĭ*. IN'CORPO'REALISM, n. *-ĭzm*, state of spiritual existence. INCOR'PORE'ITY, n. *-rē'ĭ-tĭ*, the quality of being not material. INCORPOREAL HEREDITAMENT: see HEREDITAMENT.—SYN. of ‘incorporeal’: unsubstantial; bodiless; unbodied.

INCORRECT, a. *ĭn'kŏr-rĕkt'* [F. *incorrect*, incorrect—from L. *incorrectus: in*, not, and Eng. *correct*]: not exact; not according to a copy or model; not according to truth; in *OE.*, not duly regulated or placed under proper obedience. IN'CORRECT'LY, ad. *-lĭ*, not exactly; inaccurately. IN'CORRECT'NESS, n. *-rĕkt'nĕs*, want of exactness; inaccuracy.—SYN. of ‘incorrect,: erroneous; wrong, faulty; inaccurate; inexact.

INCORRIGIBLE, a. *ĭn-kŏr′rĭ-jĭ-bl* [F. *incorrigible*—from mid. L. *incorrĭgĭb′ĭlĭs: in*, not, and Eng. *corrigible*]: that cannot be amended; bad beyond correction or reform. INCOR′RIGIBLY, ad. *-blĭ.* INCOR′RIGIBLENESS, n. *-bl nĕs,* or INCOR′RIGIBIL′ITY, n. *-bĭl′ĭ-tĭ* [F. *incorrigibilité*]: the quality of being depraved or bad beyond correction; hopeless depravity in persons.

INCORRODIBLE, a. *ĭn′kŏr-rō′dĭ-bl* [*in,* not, and *corrodible*]: that cannot be eaten away or impaired. IN′CORRO′DIBLY, ad. *-blĭ.*

INCORRUPT, a. *ĭn′kŏr-rŭpt′*, or IN′CORRUP′TED, a. [L. *incorruptus,* uncorrupted: *in,* not, and Eng. *corrupt*]: not impaired or spoiled; untainted; pure; sound. IN′CORRUP′TIBLE, a. *-tĭ-bl* [F.—L.]: not corruptible; that cannot decay; incapable of being bribed; strictly just. IN′CORRUP′TIBLY, ad. *-blĭ.* IN′CORRUP′TIBLENESS, n. *-bl-nĕs,* or IN′CORRUP′TIBIL′ITY, n. *-bĭl′ĭ-tĭ* [F. *incorruptibilité*]: the quality of being incapable of corruption or decay. IN′CORRUP′TION, n. *-rŭp′shŭn,* exemption from corruption or decay. IN′CORRUP′TIVE, a. *-tĭv,* free from corruption or decay. IN′CORRUPT′NESS, n. the quality of being exempt from decay; purity of mind and manners; integrity.

INCRASSATE, v. *ĭn-krăs′sāt* [mid. L. *incrassātus,* flattened, made thick—from L. *in,* into; *crassus,* thick, dense: F. *incrasser,* to thicken]: to thicken; to become thick or thicker: ADJ. in *bot.,* thickened. INCRAS′SATING, imp. INCRAS′SATED, pp. IN′CRASSA′TION, n. *-sā′shŭn* [F.—L.]: the act of thickening; the state of becoming thick. INCRAS′SATIVE, a. *-sā-tĭv,* having the quality of thickening.

INCREASE, n. *ĭn′krēs* [Norm. F. *encreser,* to increase: L. *incres′cĕrĕ,* to grow or increase in anything, to swell—from *in,* into; *cresco,* I grow]: growth; enlargement; addition to the original stock; accession; produce: V. *ĭn-krēs′*, to make or become more or greater; to advance or exalt; to extend; to spread; to make worse; to augment; to grow. INCREAS′ING, imp. INCREASED′, pp. *-krēst′:* ADJ. multiplied; made more or greater, as in number, bulk, value, etc. INCREAS′INGLY, ad. *-lĭ.* INCREASE-TWIST, in *rifling,* a rifle-groove which has an increased angle of twist as it approaches the muzzle, allowing the projectile to be easily started and giving it an increased velocity of rotation as it proceeds. The increase-twist is credited to Tamisier, and is comparatively modern. INCREASING-FUNCTION, in *math.,* a function that increases as the variable increases, and of course decreases as the variable decreases.—SYN. of 'increase, v.': to multiply; advance; swell; intensify; add to; exalt;—of 'increase, n.': augmentation; increment; generation; progeny.

INCREDIBLE, a. *ĭn-krĕd′ĭ-bl* [F. *incrédible*—from L. *incrēdĭb′ĭlĭs,* that cannot be believed—from *in,* not; *crēdo,* I believe: It. *incredibile*]: that cannot be believed; too improbable to admit of belief. INCRED′IBLY, ad. *-blĭ.* INCRED′IBIL′ITY, n. *-bĭl′ĭ-tĭ* [F. *incrédibilité*], or INCRED′IBLENESS, n. *-bl-nĕs,* the quality of being too extraordinary to admit of belief.

INCREDULOUS, a. *ĭn-krĕd'ū-lŭs* [L *incrēdŭlus*, unbelieving: F. *incrédule*, incredulous]: not believing; indisposed to receive as true. INCRED'ULOUSNESS, n. *-nĕs*, or INCREDULITY, n. *ĭn'krĕ-dū'lĭ-tĭ* [F. *incrédulité*]: a refusal of belief; indisposition to believe.—SYN. of 'incredulity': skepticism; unbelief; disbelief; infidelity.

INCREMATE, v. *ĭn'krĕ-māt* [L. *incrēmātus*, consumed by burning—from *in*, into; *crēmō*, I burn]: to burn a dead body instead of interring it. IN'CREMATING, imp. IN'CREMATED, pp. *-mā-tĕd*. INCREMATION, n. *ĭn'krĕ-mā'shŭn*, the burning of dead bodies instead of interring them.

INCREMENT, n. *ĭn'krĕ-mĕnt* [L. *incrēmen'tum*, an increase, growth—from *in*, into; *crescō*, I grow]: the act of becoming greater; increase; that which is added; produce; in *math.*, the quantity which increases a variable quantity. INCRESCENT, a. *ĭn-krĕs'ĕnt*, growing; augmenting; swelling.

INCRESCENT: see under INCREMENT.

INCRIMINATE, v. *ĭn-krĭm'ĭ-nāt* [L. *in*, in; *crimĭnātus*, accused of crime]: to charge with a crime or fault; to accuse. INCRIM'INATING, imp. INCRIM'INATED, pp. INCRIM'INA'TION, n. *-nā'shŭn* [F.—L.]: the act of charging with crime.

INCRUST, v. *ĭn-krŭst'* [F. *incruster*—from L. *incrustārĕ*, to cover, as with a crust—from *in*, in or on; *crusto*, I plaster: It. *incrustare*]: to cover with a hard coat or crust; to form a crust on the surface of. INCRUST'ING, imp. INCRUST'ED, pp.: ADJ. covered with a crust. IN'CRUSTA'TION, n. *-tā'shŭn* [F.—L.]: the crust or rough coat formed on the surface of a body; a covering or inlaying of marble, mosaic, and suchlike; also INCRUST'MENT, n. *-krŭst'mĕnt*.

INCUBATE, v. *ĭn'kū-bāt* [L. *incŭbātus*, lain or rested upon—*in*, in or on; *cŭbō*, I lie down]: to sit upon, as upon eggs for hatching. IN'CUBATING, imp. IN'CUBATED, pp. IN'CUBA'TION, n. *-bā'shŭn* [F.—L.]: the act of sitting on eggs for the hatching of young; in *med.*, the period during which a contagious or infectious disease lies latent before showing itself. IN'CUBATIVE, a. *-tĭv*, formed by or having the nature of incubation. IN'CUBA'TOR, n. *-tėr*, a machine for hatching eggs by artificial heat.—See INCUBATION, THE PERIOD OF.

INCUBA'TION, THE PERIOD OF: the time in which birds sit on their eggs before the young are hatched; varying in different species, but nearly constant in each. In the humming-birds, smallest animals of this class, it is only 12 days; in canaries, 15 to 18 days; in the common fowl, 21 days; in the duck, it is 28 to 30 days; in the guinea-fowl, 28 or 29 days; in the turkey, 30 days; in the swan, 40 to 45 days. A certain degree of heat (about 104°) is necessary for the development of the young bird; that of the sun is sufficient, during the day, to hatch the eggs of some birds (e.g., the ostrich) inhabiting tropical countries; but in general the mother keeps up a suitable temperature by placing the eggs in a warm and carefully constructed nest (q.v.), and by covering them with her own body. In some cases, the male bird takes part in this duty; usually, however, his services are restricted to providing his mate with food.

Eggs may, however, be hatched without the aid of the parent bird. From time immemorial, the Egyptians have hatched eggs by artificial warmth in peculiar but comparatively simple stoves for the purpose. Thirty millions of chickens are annually hatched by means of the egg-ovens in Egypt. In 1777, Bonnemain devised a hatching apparatus, which supplied the Parisian markets with poultry. In 1825, D'Arcet obtained chickens from artificial incubation by means of the thermal waters at Vichy. The *Eccaleobion* (q.v.), invented by Bucknell, was said to possess a perfect control over temperature from 300° Fahrenheit to that of cold water for any length of time. In artificial incubation, the lines that separate success from failure are easily overstepped. Of the most modern incubators, almost all have attained great perfection in regulating the temperature inside the very narrow range within which practical success is attainable, as well as in overcoming difficulties as to dampness or dryness of the atmosphere, and as to exposing the upper and under surface of the egg to slightly different temperatures. The main features of incubators usually agree—a water-tank, heated by some kind of lamp, with a tray or drawer for eggs, and a small water-tray for damping the air. The most fatal defect in an incubator is that of permitting an injurious rise of temperature. The process is used mainly for hen's eggs, but is not confined to them. See OSTRICH-FARMING.

INCUBUS, n. *ĭn′kū-bŭs* [mid. L. *incŭbŭs*, a nightmare—from L. *incŭbārĕ*, to lie upon—from *in*, upon; *cŭbō*, I lie down: It. *incubo;* F. *incube*, nightmare]: the nightmare; that which sits upon, as some hideous monster; any oppressive or stupefying influence.

INCULCATE, v. *ĭn-kŭl′kāt* [L. *inculcātus*, pressed or forced into, crammed in—from *in*, into; *calcārĕ*, to tread: It. *inculcare—lit.*, to tread into with the heel]: to impress or enforce by frequent admonitions; to teach by frequent repetitions. INCUL′CATING, imp. INCUL′CATED, pp. INCUL′CATOR, n. *-kā-tėr*, one who. IN′CULCA′TION, n. *-kā′shŭn*, the act of impressing on the mind by frequent repetitions.

INCULPABLE, a. *ĭn-kŭl′pă-bl* [mid. L. *inculpābĭlĭs:* L. *in*, not, and Eng. *culpable*]: without fault; that cannot be blamed or accused. INCUL′PABLY, ad. *-blĭ.* INCUL′PABLENESS, n. *-bl-nĕs.*

INCULPATE, v. *ĭn-kŭl′pāt* [mid. L. *inculpātŭs*, brought blame upon—from L. *in*, into; *culpātŭs*, reproached, blamed—from *culpa*, a fault: F. *inculper*]: to bring into blame; to censure; opposed to *exculpate.* INCUL′PATING, imp. INCUL′PATED, pp. IN′CULPA′TION, n. *-pā′shŭn* [F.—L.]: blame; censure. INCUL′PATORY, a. *-pă′tėr-ĭ*, imputing blame; criminatory.

INCUMBENT, a. *ĭn-kŭm′bĕnt* [L. *incumbens*, or *incumben′tem*, leaning or lying upon—from *in; cubo* or *cumbo*, I lie down]: lying or resting on, as a duty or obligation; indispensable; in *bot.*, applied to cotyledons with the radicle on their back: N. the person who is in the possession of an office, e.g. the rector, parson, or vicar holding an ecclesiastical benefice in England. In Scotland the term is so applied only popularly. INCUM′BENTLY, ad. *-lĭ*. INCUM′BENCY, n. *-bĕn-sĭ*, the state of holding or being in possession of an ecclesiastical office.

INCUMBER, etc.: see ENCUMBER.

INCUM′BERED ESTATES COURTS, in Great Britain: tribunals established under recent statutes for disposing more readily than the ordinary judicial machinery will permit, of landed property subject to incumbrances, or legal claims at the instance of other persons than the proprietors. The want of such courts was felt first in Ireland. In the second quarter of this century, the rents of many Irish estates did not suffice to pay the interests of the debts created over them; and the number of such incumbered properties was increased by the abolition of the corn laws 1846, which lessened the demand for those products of tillage which had rendered the cultivation of the soil possible by cottier tenants. It was believed that Ireland must become a grazing country; but that it could do so only in the hands of capitalist farmers, or landlords farming their own lands, and that a complete revolution in tenure was required to put them in possession of the soil. The sluggish and expensive procedure of the court of chancery made it impossible to effect this; and it became necessary to call into existence some more simple machinery by which property could be transferred from the old to a new class of proprietors. An auction-mart rather than a legal tribunal was wanted, under the control of officers able to scrutinize titles and adjust claims on landed property with care, yet without undue delay, and authorized to sell incumbered estates in the market, to hand over a good and simple title to the purchasers, and to divide the sum realized among the proprietors, mortgagees, and others concerned, according to their interests. To accomplish this, an act was passed 1848; but, owing to defective construction, it was inoperative. It was followed 1849, by a second act, the object of which was to enable any owner of land, or of a lease of land for not less than 63 years unexpired, subject to incumbrance, to apply to commissioners appointed under it, and forming a court of record, to direct a sale. The total number of petitions presented in the eight years ending 1857 was 4,413, of which 1,363 were lodged by owners. The number of absolute orders for sale during the same period was 3,547. The gross amount produced by sales from the foundation of the court to 1859, Aug., was £25,190,839, of which there was distributed to creditors £24,229,027, including $3,692,611, allowed to incumbrancers who became purchasers. A sum of £961,809 remained in hand to satisfy unadjusted claims. At this period, however, the business before the court had almost ceased. There were, in fact, no longer mortgagees exasperated by long sufferings left to petition; all the incumbered land had been sold, and everybody with claims on it had been paid. It was then determined that the new tribunal should-with wider functions be rendered permanent. The Landed Estates (Ireland) Act, 1858, abolished the Incumbered Estates Court, and transferred the judges and officers to the Landed Estates Court, a permanent tribunal, with the wider functions required, and with various other powers connected with the declaration of title, partitions, exchanges, and redistribution of land. The Record of Title Office, the counterpart of the Land Registry Office in England, has been since placed under the direction of the Landed Estates Court. Since the passing of the act 1865 to 1871, Nov., 493 estates had been registered, valued at £1,715,870, the amount of mortgages recorded being £177,344. 1858, Nov. 1—1862, Jan. 31, the amount realized by sales made by the Landed Estates Court was £5,940,990; and the approximate capital value of estates brought under its jurisdiction, but remaining unsold, £3,664,996. The rental and value of the estates sold 1870,75, and 77, are indicated in the following summary:

	1870.	1875.	1877.
Net rental of estates sold, . . .	£46,269	£63,292	£74,200
Amount of purchase-money, . .	£757,218	£1,209,488	£1,490,453
Number of sales, ...	201	258	310

There can be no doubt that the statute creating these courts have facilitated a great revolution in the tenure of the land in Ireland. They supplied the means by which much of the soil passed rapidly from cottier tenants (i.e., laborers paying rents determined by competition) and an embarrassed and non-resident gentry, to capitalist farmers and to landlords who cultivated the soil themselves, and under whom the country rapidly increased in agricultural prosperity. There can be as little doubt, however, that the process inflicted grievous injury on the tenants. It had never been usual in Ireland, as in other countries, for the landlord to bear the expense of permanent improvements. These were carried out by the tenant, who trusted to make an arrangement with regard to rent which would compensate him for his expenditure of labor or money. The sales under the Incumbered and Landed Estates Acts deprived the tenant of all power to make such claims. Increased rents were demanded under pain of eviction, and the result was that small farmers were obliged to emigrate to remove to the towns in search of work, or remain as servants on their old farms. The Irish peasantry were not a class to submit quietly to such changes. Acts of retaliation and widespread discontent were the consequences, and it was found necessary to reconsider the whole subject of land tenure in Ireland. The conclusion reached was that exceptional legislation was necessary for this part of the United Kingdom; and accordingly, 1870, Aug. 1, the Irish Land Act was passed, which effectually checked what was described as the grievous wrong and injustice to tenants by the purchasers in the land courts. The Land Act of 1881 conferred unparalleled privileges on the Irish tenant farmer, and constituted a new court for establishing a judicial rent and other purposes (see LANDLORD AND TENANT);

and there was further legislation 1882 in the tenants' interests.—See *The Story of the Incumbered Estates Court*, by Fitzgerald, 1862; and Thom's *Irish Almanac*, which gives annually a summary of the information contained in the Return made to the house of commons.

In 1854, the W. Indian Incumbered Estates Court was established, with purposes and regulations similar to those of the Irish Incumbered Estates Act, the court of the chief commission being held, however, in Westminster, where it still sits.

INCUM'BRANCES, or ENCUM'BRANCES: general term for burdens or charges on land: see MORTGAGE: LIEN: INCUMBERED ESTATES COURTS.

INCUNABULA, n. plu. *ĭn'kū-nā'bū-lă* [L. *incūnābŭlă*, swathing-bands, a birth-place—from *in*, into; *cūnābŭlă*, a cradle]: books printed in the early period of the art; the books which, as Peignot has it, *touchent au berceau de l'imprimerie*. The term is usually restricted to those which appeared before 1500, by which time the art was completely formed in all its principal departments. The number of these works is probably not far short of 20,000. Hain, it is true, in his *Repertorium Bibliographicum*, enumerates only 16,299; but his death left his work incomplete, especially the last volume.—I. with hardly any exceptions, belong to the category of rare books, and are much sought by collectors; but besides their interests as literary curiosities, many, e.g., the first editions (*editiones principes*) of the Greek and Roman classics, are intrinsically valuable in a critical view; while others are important, as marking the successive steps of advancement in the art of printing. See PRINTING.

The principal works treating specially of I. are—Panzer, *Annales Typographici, ab Artis Inventæ Origine ad Annum M.D.* (continued, however, to 1536); 11 vols. 4to, Norimbergæ, 1793–1803; Maittaire, *Annales Typographici, ab Artis Inventæ Origine ad Annum* 1557 (*cum Appendice ad Ann.* 1664), 3 tom. in 5 vols. 4to, Hagæ-Comit. 1719–25; Serna Santander, *Dictionnaire Bibliographique Choisi du XV*^{e} *Siècle* 3 tom. 8vo, Bruxelles 1805–7; and Hain, *Repertorium Bibliographicum, quo Libri omnes ab Arte Inventa usque ad M.D. Typis Expressi recensentur*, 4 tom. 8vo, Stutgartiæ 1828–38. With all its imperfections, the last is the best work on the subject. Much valuable information is also in Bernard, *De l'Origine et des Débuts de l'Imprimerie en Europe* (1853); and, on French I., in Brunet's *La France Littéraire au XV*^{e} *Siècle* (1865).

INCUR, v. *ĭn-kėr'* [L. *incur'rěrě*, to run or rush into—from *in*, into; *curro*, I run]: to become liable or subject to; to contract, as a debt. INCUR'RING, imp. INCURRED', pp. *-kėrd'*.

INCURABLE, a. *ĭn-kū'ră-bl* [F. *incurable*—from mid. L. *incūrābĭlĭs: in*, not, and Eng. *curable:* It. *incurabile*]: that cannot be cured; incapable of remedy or cure; irremediable: N. one beyond the reach of cure. INCU'RABLY, ad. *-blĭ*. INCU'RABLENESS, n. *-bl-něs*, or INCU'RABIL'ITY, n. *-bĭl'ĭ-tĭ* [F. *incurabilité*]: a state not admitting of any cure; impossibility of cure.—SYN. of 'incurable a.': remediless; irretrievable; irrecoverable; hopeless.

INCURIOUS, a. *ĭn-kū'rĭ-ŭs* [L. *incūrĭōsŭs*—from *in*, not; *curiōsus*, inquisitive: F. *incurieux*]: not curious or inquisitive; inattentive. INCU'RIOUSLY, ad. *-lĭ*. INCU'RIOUSNESS, n. *-nĕs*, or INCU'RIOS'ITY, n. *-ŏs'ĭ-tĭ*, want of curiosity; inattentiveness.

INCURSION, n. *ĭn-kėr'shŭn* [F. *incursion*—from L. *incursĭōnem*, a running against, an onset—from *in*, into; *cursus*, a running: It. *incursione*]: a sudden inroad or invasion for plunder or attack; a predatory inroad without occupation. INCUR'SIVE, a. *-sĭv*, pertaining to an incursion; hostile.—SYN. of 'incursion': inroad; invasion; foray; raid; irruption; intrusion; attack; ravaging.

INCURVATE, v. *ĭn-kėr'vāt* [L. *incurvātus*, bent into a curve—from *in*, into; *curvus*, bent, crooked]: to bend; to crook: ADJ. curved inwards or upwards. INCUR'VATING, imp. INCUR'VATED, pp.: ADJ. gradually bending from without inwards. IN'CURVA'TION, n. *-vā'shŭn*, state of being bent; act of bowing or bending. INCURVE, v. *ĭn-kėrv'*, to curve; to curve in or inwardly; to become bent. INCUR'VING, imp. INCURVED' pp. *-kėrvd'*. INCUR'VITY, n. *-kėr'vĭ-tĭ*, crookedness.

INCUS, n. *ĭn'kŭs* [L. *incūs*, a smith's anvil]: a small bone of the ear, so called from its supposed resemblance to an anvil.

INCUSE, a. *ĭn-kūz'* [L. *incussus*, struck or dashed against]: formed by stamping; stamped: V. to form by stamping. INCU'SING, imp. INCUSED, pp. *ĭn-kūzd'*.

INDART, v. *ĭn-dârt'* [*in*, and *dart*]: in *OE.*, to dart in; to strike in: see DART.

INDEBI'TATUS ASSUMP'SIT: name often given to an action for debt in England.

INDEBTED, a. *ĭn-dĕt'ĕd* [OF. *endetter* and *endebter*, to bring into debt—from *en*, in, into; *dette* and *debte*, a debt—from L. *in*, into; *dēbĭtus*, owed]: being in debt; obliged by something received. INDEBT'EDNESS, n. *-nĕs*, state of being indebted.

INDECENCY, n. *ĭn-dē'sĕn-sĭ* [*in*, not, and *decency;* L. *indĕcens*, or *indĕcen'tem*, unseemly, indecent: It. *indecento:* F. *indécent*]: that which is unbecoming in language or manners; an offense against delicacy. INDE'CENT, a. *-sĕnt*, unfit to be seen or heard; offensive to modesty. INDE'CENTLY, ad. *-lĭ*. INDECENT EXPOSURE, criminal offense by common law and by statute, if committed in any public place. To sell or expose an obscene book, print, or picture, also is criminal; and a search-warrant may be obtained to search premises and seize and destroy such articles.—SYN. of 'indecent': immodest; indelicate; indecorous; impure; obscene; unbecoming; unseemly; gross; unchaste; shameful; filthy.

INDECIDUATA, n. *ĭn-dē-sĭd-ū-ā'ta* [mod. L., prefix *in*, not; *deciduatus*—from *deciduus*, that which is cut or lopped off]: in *zool.*, a primary division of *Placental Mammalia*, named by Prof. Huxley from their having the placenta non-deciduous. It contains the orders *Ungulata* and *Cetacea*.

INDECISION, n. *ĭn'dĕ-sĭzh'ŭn* [F. *indécision*—from L. *indecisiōnem: in*, not, and Eng. *decision*]: want of settled purpose or of firmness; a wavering of mind; irresolution. IN'DECI'SIVE, a. *-sī'sĭv*, unsettled; wavering; not bringing to a final close or issue. IN'DECI'SIVELY, ad. *-lĭ*. IN'DECI'SIVENESS, n. *-nĕs*, state of being undecided.

INDECLINABLE, a. *ĭn'dĕ-klī'nă-bl* [F. *indéclinable*—from mid. L. *indĕclīnab'ĭlĭs: in*, not, and Eng. *declinable*]: that cannot be varied by terminations. IN'DECLI'NABLY, ad. *-blĭ*.

INDECOMPOSABLE, a. *ĭn-dē'kŏm-pō'ză-bl* [F. *indécomposable: in*, not, and Eng. *decomposable*]: that cannot be decomposed or resolved into its constituent parts.

INDECOROUS, a. *ĭn'dĕ-kō'rŭs* [L. *indĕcōrŭs*, unseemly, unbecoming: *in*, not, and Eng. *decorous*]: unbecoming; violating good manners. IN'DECO'ROUSLY, ad. *-lĭ*. IN'DECO'ROUSNESS, n. *-nĕs*. IN'DECO'RUM, n. *-rŭm* [L.]: impropriety of behavior; that in manners or behavior which violates the rules of good breeding or civility.—SYN. of 'indecorous': indecent; rude; coarse; unseemly; uncivil; impolite.

INDEED, ad. int. *ĭn-dēd'* [*in*, in or on, and *deed*]: in reality; in fact; in truth.

INDEFATIGABLE, a. *ĭn'dĕ-făt'ĭ-gă-bl* [F. *indéfatigable*—from L. *indefătĭgābĭlĭs*, that cannot be wearied out—from *in*, not; *defătīgō*, I weary]: unwearied; not yielding to fatigue. IN'DEFAT'IGABLY, ad. *-blĭ*. IN'DEFAT'IGABLENESS, n. *-bl-nĕs*, or IN'DEFAT'IGABIL'ITY, n. *-bĭl'ĭ-tĭ*, incapability of being fatigued.—SYN. of 'indefatigable': persevering; assiduous; untiring; unfatigued.

INDEFEASIBLE, a. *ĭn'dĕ-fē'zĭ-bl* [*in*, not, and *defeasible*]: not to be defeated; that cannot be made void. IN'DEFEA'SIBLY, ad. *-blĭ*. IN'DEFEA'SIBIL'ITY, n. *-bĭl'ĭ-tĭ*, the quality or state of not being subject to be made void.

INDEFECTIBLE, a. *ĭn'dĕ-fĕk'tĭ-bl* [*in*, not, and *defectible* (see DEFECT)]: not liable to defect or decay; unfailing. IN'DEFEC'TIBIL'ITY, n. *-bĭl'ĭ-tĭ*, the state of being subject to no defect; incapability of suffering decay. IN'DEFEC'TIVE, a. *-fĕk'tĭv*, not defective; complete; perfect.

INDEFENSIBLE, a. *ĭn'dĕ-fĕn'sĭ-bl* [*in*, not, and *defensible*]: that cannot be defended; not to be vindicated or justified. IN'DEFEN'SIBLY, ad. *-blĭ*. IN'DEFEN'SIBIL'ITY, n. *-bĭl'ĭ-tĭ*.

INDEFINABLE, a. *ĭn'dĕ-fī'nă-bl* [*in*, not, and *definable*]: that cannot be defined. IN'DEFI'NABLY, ad. *-blĭ*.

INDEFINITE, a. *ĭn-dĕf'ĭ-nĭt* [*in*, not, and *definite:* L. *indēfinītus*, indefinite]: not limited; not precise or certain; not distinctly marked; vague or unsettled; in *bot.*, applied to inflorescence in which the central or terminal flower is the last to expand; having more than twenty stamens; very numerous, as ovules or seeds. INDEF′INITELY, ad. *-lĭ.* INDEF′INITENESS, n. *-nĕs,* the quality of being unlimited or uncertain.

INDEHISCENT, a. *ĭn′dĕ-hĭs′sĕnt* [L. *in,* not; *dehiscen′tem,* gaping—from *dehis′co,* I gape]: in *bot.,* not opening—applied to fruits, as the apple, which do not split open.

INDELIBERATE, a. *ĭn′dĕ-lĭb′ėr-āt* [*in,* not, and *deliberate:* mid. L. *indēlībĕrātus*]: done or performed without consideration; sudden. IN′DELIB′ERATELY, ad. *-lĭ.*

INDELIBLE, a. *ĭn-dĕl′ĭ-bl* [F. *indélébile*—from L. *indelēbĭlĭs,* imperishable—from *in,* not; *dēlĕō,* I blot out: It. *indelebile*]: that cannot be blotted out; that cannot be effaced, cancelled, or removed. INDEL′IBLY, ad. *-blĭ.* INDEL′IBIL′ITY, n. *-bĭl′ĭ-tĭ,* quality of being indelible.

INDELICATE, a. *ĭn-dĕl′ĭ-kāt* [*in,* not, and *delicate:* F. *indélicat*]: offensive to good manners or purity of mind; coarse; indecorous. INDELICACY, n. *ĭn-dĕl′ĭ-kă-sĭ,* want of delicacy; that which is offensive to refined taste or purity of mind; a certain coarseness of manners or language. INDEL′ICATELY, ad. *-kāt-lĭ.*—SYN. of 'indelicate': unseemly; unbecoming; gross; rude; indecent; impolite; broad; offensive.

INDEMNIFY, v. *ĭn-dĕm′nĭ-fī* [L. *in,* against; *damnum,* loss; *făcĭō,* I make: F. *indemne,* indemnified, unhurt—from L. *indemnis,* uninjured]: to secure against loss, damage, or punishment; to make good what has been lost; to compensate. INDEM′NIFYING, imp. INDEM′NIFIED, pp. *-nĭ-fīd.* INDEM′NIFICA′TION, n. *-fĭ-kā′shŭn,* the act of indemnifying; security against loss or damage; the payment made on account of such loss. INDEM′NITY, n. *-nĭ-tĭ* [F. *indemnité*—from mid. L. *indemnĭtātem*]: a security or pledge by which a person is secured against loss or punishment; compensation. INDEMNITY-DEED, in *law,* deed given by way of security: the usual form is by giving a bond of indemnity which operates if the engagement is not fulfilled, but otherwise becomes void. ACT OF INDEMNITY, an act of parliament passed to relieve a government or its agents from the consequences of illegal acts which urgent circumstances may, in their opinion; have rendered necessary.

INDEMONSTRABLE, a. *ĭn′dĕ mŏn′stră-bl* [*in,* not, and *demonstrable:* mid. L. *indemonstrābĭlĭs*]: that cannot be demonstrated; not evident.

INDENT, v. *ĭn-dĕnt′* [mid. L. *indentātus,* having a toothed or serrated edge or border—from L. *in,* into; F. *dent,* a tooth—from L. *dentem,* a tooth]: to notch; to cut into inequalities, like a row of teeth; to make a compact; to contract; to bargain; to order; in *OE.,* to run in and out; to zigzag: N. a stamp; an inequality; an incision; a contract; an order, as for goods. INDENT′ING, imp. INDENT′ED, pp.: ADJ. notched, like the teeth of a saw; undulated; sinuous: in *her.,* applied to one of the partition lines of the shield, notched similarly to dancette (q.v.), but with the notches much smaller and not limited in number. IN′DENTA′TION, n. *-tā′shŭn,* a notch or jag; a cut or depression in any margin or border; in *printing*, the commencement of the first line of a paragraph farther in than the other lines—called *common indentation;* the commencement of the second and succeeding lines farther in than the first line is called *hanging* or *reverse indentation*. INDENTURE, n. *ĭn-dĕn'tūr* [mid. L. *indentūră*, a paper with a notched edge corresponding to the notched edge of another separated part]: written covenant or contract, e.g. of apprenticeship—originally required to be one of two copies made on the same skin or parchment, which were then separated by a zigzag cutting, so as to correspond when put together again: this is no longer requisite: V. to bind by a written contract or indenture; in *OE.*, to run in and out like a jagged surface; to wrinkle. INDEN'TURING, imp. INDEN'TURED, pp. *-tūrd.*—SYN. of 'indentation': impression; print; mark; stamp; depression.

INDENT'ED HEAD: peninsula in the colony of Victoria, w. boundary of the entrance of Port Phillip.

INDEPEN'DENCE, DECLARA'TION OF: see DECLARATION OF INDEPENDENCE.

INDEPENDENT, a. *ĭn'dĕ-pĕn'dĕnt* [*in*, not, and *dependent:* It. *independente:* F. *indépendant*]: not subordinate; not holding or enjoying at the will of another; self-relying or self-directing; not connected with; possessing moderate wealth. IN'DEPEN'DENCE, n. *-dĕns*, or IN'DEPEN'DENCY, n. *-dĕn-sĭ*, sufficient means to support one's self; state over which none has power; exemption from undue influence; in *bot.*, the separation of organs usually entire. IN'DEPEN'DENTLY, ad. *-lĭ*. INDEPENDENCE DAY, in the *United States*, the fourth day of July, anniversary of the adoption of the Declaration of Independence (q.v.). INDEPENDENE STATES, states recognized in international law as self-governing in their internal affairs, and as dealing with all other states on terms of equal sovereignty. The states of the American Union are not thus independent—being self-governed not absolutely and universally, but only in a certain range of civil functions; also not exercising sovereignty in international relations.

INDEPEN'DENTS: name formerly given in Britain to adherents of the church-order now known as CONGREGATIONALISM (q.v.).

INDERAB': see ANDERAB.

INDESCRIBABLE, a. *ĭn'dĕ-skrī'bă-bl* [*in*, not, and *describable*]: that cannot be described.

INDESIRABLE, a. *ĭn'dĕ-zī'ră-bl* [*in*, not, and *desirable*]: not desirable—now rather spelled *undesirable*.

INDESTRUCTIBLE, a. *ĭn'dĕ-strŭk'tĭ-bl* [*in*, not, and *destructible:* F. *indestructible*]: that cannot be destroyed; imperishable. IN'DESTRUC'TIBLY, ad. *-blĭ*. IN'DESTRUC'TIBIL'ITY, n. *-bĭl'ĭ-tĭ*, quality of being incapable of destruction.

INDETERMINABLE, a. *ĭn'dĕ-tėr'mĭn-ă-bl* [*in*, not, and *determinable:* F. *indéterminé*, undetermined—from L. *indētermĭnātus*]: that cannot be determined, ascertained, or settled. IN'DETER'MINABLY, ad. *-blĭ.* IN'DETER'MINATE, a. *-mĭn-āt* [mid. L. *indētermĭnātus*, undefined—from *in*, not; *determĭnātus*, defined, limited]: variable; indefinite; uncertain; in *math.*, applied to problems which admit an unlimited number of solutions; in *bot.*, applied to indefinite inflorescence. IN'DETER'MINATELY, ad. *-lĭ.* IN'DETER'MINA'TION, n. *-ā'shŭn* [F.—L.]: want of determination; irresolution. IN'DETER'MINED, a. *-mĭnd*, unsettled; unfixed.

INDETER'MINATE PROB'LEMS: in Mathematics, problems admitting an unlimited number of solutions. It is shown under the title EQUATION that the values of the unknown quantities could be determined only when the number of equations was equal to the number of unknown quantities; but that, if the latter exceeded the former, *several* values might be found for each unknown, in which case the problems which give rise to the equations are called *indeterminate problems.* For example, 'To find the number which, when divided by 2 and 3, leaves remainders 1 and 2,' is an indeterminate problem, admitting of an infinite number of solutions; for though only one unknown quantity appears in the question, yet, in order to form an equation, we are obliged to proceed in the following manner; as x is divisible by 2, with a remainder 1, $x = 2p + 1$; again, as x is divisible by 3, with a remainder 2, $x = 3q + 2$; hence we have the equation $2p + 1 = 3q + 2$ (one equation to find two unknown quantities), from which, by a process explained in the ordinary books on algebra, we find $x = 6r - 1$, where r is any positive number whatever. The values of x are, therefore, 5, 11, 17, 23, etc. In general, if the equation is of the form $ax + by = c$, the number of pairs of values (of x and y) is finite; but if of the form $ax - by = c$, the number is infinite. The Diophantine analysis (q.v.) exhibits a very interesting class of indeterminate problems of the second degree.

INDEVOUT, a. *ĭn'dĕ-vowt'* [F *indévot: in*, not, and Eng. *devout*]: not devout; irreligious.

INDEX, n. *ĭn'dĕks*, INDEXES, n. plu. *ĭn'dĕks-ĕz*, or INDICES, n. plu. *ĭn'dĭ-sēz* [L. *index*, a discoverer, the forefinger; *indĭcō*, I point out, I show]: the forefinger, being that employed in pointing at an object; that which points out; a table of references; in *alg.*, the indicator of the power of a quantity: V. to provide with or form a table of references to, as to a book. IN'DEXING, imp. IN'DEXED, pp. *-dĕkst*, provided with an index. IMDEX'ICAL, a. *-ĭ-kăl*, pertaining to; having the form of an index. INDEX'ICALLY, ad. *-lĭ.* INDEX EXPURGATORIUS, *-ĕks-pėr'gă-tōr'ĭ-ŭs* [L. *expurgātus*, purged quite, cleansed]: a list of passages of books, which are to be expunged or altered. **INDEX-HANDS, the pointers of a clock, a watch, and suchlike.**

IN'DEX (more fully INDEX LIBRORUM PROHIBITORUM): catalogue, published by papal authority in the Rom. Cath. Church, of books the reading of which is prohibited to members of that church, whether on doctrinal, moral, or religious grounds. As a natural consequence of the claim of the Rom. Cath. Church to authority in matters of religion, and to infallibility, that church also claims the right or the duty of watching over the faith of its members, and of guarding it against every danger of corruption, chief among which is held to be the circulation of books believed to be injurious to faith or to morality. The earliest recorded exercise of this restrictive authority is the prohibition of the writings of Arius; and a council of Carthage, 398, issued, even for bishops, a similar prohibition of Gentile books, though it permitted to them the reading of the works of heretics. The earliest example of a prohibitory catalogue is in the decree of a council at Rome (494) under Pope Gelasius (*Labbe Conc.*, ii. col. 938–941), which, having enumerated the canonical books of Scripture, and other approved works, recites also the apocryphal books; together with a long list of heretical authors, whose writings it prohibits, and orders to be eliminated from the churches. The mediæval popes and councils pursued the same course as to the heterodox or dangerous writings of their respective periods, and the multiplication of such books after the invention of printing led to a more stringent as well as more systematic procedure. The university press of Louvain issued, 1546, again 1550, a catalogue of prohibited books. Similar lists appeared by authority at Venice, Paris, and Cologne; and Pius IV. issued, 1557 and 59, what may be regarded as properly the first Roman Index. One of the gravest undertakings of the Council of Trent was a more complete and authoritative enumeration of all those books the use of which it was expedient to prohibit to the faithful. A committee was appointed for the purpose, and had made great progress in the work; but it was found impossible to bring the examination of the books to an end before the close of the council; and all the papers of the committee were handed over by the council to the pope, with instructions that the work should be completed, and the result published by his own authority, which was accordingly done by Pius IV. 1564. Further additions and certain modifications of its rules were made by Sixtus V. and Clement VII. It was republished 1595, and with the addition of such books as from time to time it was deemed expedient to prohibit, in several subsequent editions, the most remarkable of which are those of Brasichelli (Rome 1607); Quiroga, *Index Librorum Expurgandorum* (Salamanca 1601); and Sotomayor, *Novissimus Index* (Madrid 1648). The edition best known to modern theological readers is that of Rome 1819. In the intervals between the editions, the decrees by which further additions to the Index are made, are made public at Rome, and circulated in the various countries.

The prohibitions of the Roman Index are of two classes, either absolute and total, or partial and provisional 'until the book shall have been corrected.' The edition of Quiroga, mentioned above, regards the latter The ground of the prohibition may be either the authorship of the work, or its subject, or both together. Under the first head are prohibited all writings of *heresiarchs*—i.e., the first founders of heresies—no matter what may be the subject. Under the second head are prohibited all books confessedly immoral, and all books on magic, necromancy, etc. Under the third are prohibited all books of heretical authorship treating on doctrinal subjects; all versions of the Bible by heretical authors; and all books, no matter by whom written, which contain statements, doctrines, or insinuations prejudicial to the Rom. Cath. religion. The preparation of the Index, in the first instance, was committed to the care of the Congregation of the Inquisition in Rome; but a special Congregation of the Index was established by Pius V., and more fully organized by Sixtus V. This congregation consists of a prefect (who is always a cardinal), of cardinals, of consulters, and of examiners of books (*qualificatores*). Its proceedings are governed by rules which have been authoritatively laid down by several popes, especially by Benedict XIV., in a constitution issued 1753, July 10, to which the reader is referred for the best and most authentic exposition of a subject on which much misconception exists on the part of Rom. Catholics as well as of Protestants.

The growth of modern literature has of course entirely outstripped the limited and tardy machinery of this tribunal. A very small proportion, even of publications most opposed to the Roman Church, outside of Italy, find their way by name to the Roman Index; but besides the positive prohibitions of the Index itself, there are certain general rules regarding the use of books by which the freedom of what is considered perilous or pernicious reading is much limited among members of that communion. Such rules, however, cannot be practically brought into operation in those countries where the Rom. Cath. and Prot. literatures are so interwoven that it is impossible to separate them even in the ordinary intercourse of life. See Wetzer's *Kirchen-Lexicon*, art. 'Index.'

Few parts of the Rom. Cath. system are more repugnant to Protestants than the institution of the 'Index,' as it strikes at the root of the fundamental principle of Protestantism itself—namely, that of private judgment. And this theoretical repugnance is increased by seeing that, in its practical working, such names as Gibbon, Robertson, Guicciardini, Sismondi, Hallam, Goldsmith (*History of England*), Descartes, Locke, Kant (*Essay on Pure Reason*), J. S. Mill (*Political Economy*), Whately (*Logic*), Bacon, Milton, Addison, Dante (*De Monarchia*), etc., are put under the ban.

INDEXTERITY, n. *ĭn'dĕk-stĕr'ĭ-tĭ* [*in*, not, and *dexterity*]: want of skill or readiness.

INDIA, *ĭn'dĭ-a* [name borrowed by the Greeks from the Persians, who, however, applied the name of Hindus at first only to the dwellers on the banks of the river *Sindhu* (Skr. for Indus): from this, by the regular change of *s* into *h*, the Persian *Hind* is derived. Hindustán (the country of the Hindus) is a modern word applied by the Persians to the whole of India; but Europeans understand it as applying properly to that portion of it n. of the Vindhya Mountains]: extensive region of Asia, celebrated during many ages for its riches and valuable natural productions, its beautiful manufactures and costly merchandise, the magnificence of its sovereigns, and the early civilization of its people. Its recent history has an interesting connection with the history of England.

Hither I. is the central peninsula of s. Asia; 8° 4'—35° n. lat., and 67°—92° e. long. According to these limits, its length is approximately 1,900 m.; its breadth, along the parallel of 25° n. lat., 1,600 m.; about 1,300,000 sq. m. The natural boundaries of the vast region are, on the n., the range of the Himalaya Mountains, which separates it from Tartary, China, and Tibet; on the w., the Suliman Mountains divide it from Afghanistan and Beloochistan; on the s., the Arabian Sea and the Gulf of Bengal; on the e., the hill-ranges which separate Chittagong and Assam from Burmah. From the mouths of the Brahmaputra and the Indus, the e. and w. coasts, inclining toward the same point, meet at Cape Comorin, and thus give to southern I. the form of an irregular triangle. The two sides of the triangle have each a coast-line of about 2,000 m. I. is, in fact, from its great extent of seaboard, essentially a maritime country.

Further I. is the name given to the s.e. peninsula of Asia. It is not treated of in this article: for information concerning it, see Siam: Burmah: Cochin-China: etc.

Physical Features.—Hither I. presents a most diversified surface and varied scenery; it has indeed been called 'an epitome of the whole earth,' consisting as it does of mountains far above the level of perpetual snow; broad and fertile plains bathed in intensest sunshine, arid wastes, and impenetrable forests. Its great natural divisions are the sub-Himalayan countries, the plain of the Ganges, the plain of the Indus, the highlands of n. Hindustan, and the peninsular portion of the country s. of the Vindhya Mountains.

The Sub-Himalayan Countries form an elevated tract between the chief ridge of the Himalayas and the lower elevations which adjoin the plains of the Ganges and Indus. They consist of Cashmere, Gurhwal, Kumaon, Nepaul, Sikkim, and Bhotan, all hill-countries, which, owing to their elevation above the sea, have a cool climate and the vegetation of the temperate zones. These regions are separated from the plain of the Ganges by the Terai, or Great Indian swamp, which extends in a long belt, 5 to 25 m. in width, from Hurdwar to the Brahmaputra. It is covered with great forest trees, and is the haunt of innumerable wild beasts. The soil is very fertile, but malaria renders it uninhabitable by man and the domestic animals, at least from April to October. It is said to be then abandoned by even the wild beasts. This wilderness forms a great physical barrier between the hill-countries and the plains, and separates populations distinct from each other in race and language.

The Plain of the Ganges, which includes Bengal, Bahar, the Doab, Oude, and Rohilcund, is a vast alluvial flat, extending from the Bay of Bengal to the Punjab. Throughout its entire length, the Ganges and its numerous tributaries spread out like the veins of a leaf, carrying everywhere their fertilizing influence. The population of these fertile and well-cultivated plains is very dense. Scattered over the agricultural districts, and massed in the great cities and towns, there are not less than 100,000,000 people.

The Plains of the Indus, in the n.w., are less extensive than those of the Ganges, and are separated from the latter by the Aravulli Hills. The Punjab occupies the n. portion. S. of the Punjab, and parallel with the river, the great sandy desert of the Indus extends nearly 500 m. The valley of the Indus is continued through Sinde to the ocean. The plains of the Indus may be considered to include Cutch and Gugerat, which like them slope toward the Arabian Sea. Between the Indus and the Aravulli Mountains lies the Thur or Indian desert, an expanse covered with sand-hills, 40 m. long and 100 broad. It is only in the neighborhood of the Indus and the Luni that the surface can be cultivated—though crops of grain may be grown in a few narrow valleys after the rains. This almost impassable desert is described in Hindu geography as 'the region of death.' Like the Terai, it forms a great physical barrier separating w. and e. India.

The Highlands of Northern Hindustan extend from the Vindhya Mountains, as a base, to the border of the Thur. They include the table-land of Malwa and Rajpootana, or Rajasthan, which has an elevation of about 2,000 ft. above sea-level.

The Peninsular Portion of I., s. of the Vindhya Mountains, which remains to be considered, is called by the natives the Deccan (q.v.). The most remarkable geographical feature of this area is a central table-land—a vast plateau—from 12° to 21° n. lat., 2,000 to 3,000 ft. above the sea, and inclosed on all sides by lofty mountains, between which and the sea on the e. and w., are narrow strips of low, flat country, divided into several districts. From the low country on the coast to the central table-land, the mountains rise abruptly, in a succession of gigantic terraces or steps; hence the name of 'Ghauts' (q.v.). The rivers of the Deccan rise in the W. Ghauts, and after traversing the table-land, descend to the sea over the E. Ghauts. The slope of the country corresponds with the course of the rivers; it has a gradual inclination toward the east. Ceylon, the Lacadive, and Maladive Islands also may be considered to belong to this part of India.

The *Himalaya* (q.v.) and the *Suliman* Mountains (see AFGHANISTAN) far exceed in altitude the chains which lie within the boundaries of India. The *Vindhya* Mountains, which cross I. between 22° and 25° of n. lat., and separate Hindustan proper from the s. or peninsular portion of the country, nowhere exceed 6,000 ft. in height. The Satpura range, between the Nerbudda and Tapti valleys, is a spur of the Vindhya. The *Western Ghauts* run parallel with the Indian Ocean at a distance of 20 to 40 m. At Mahabaleshwar, the sanitarium of Bombay, they rise to 4,500 ft., but they are lofty near Coorg, where one summit has an elevation of 7,000 ft. On the opposite coast, forming the s.e. buttress of the table-land of the Deccan, are the *Eastern Ghauts* (see GHAUTS). The physical geography of southern I. presents the singular phenomenon of isolated masses upheaved amid the vast plains that occupy the greater portion of the peninsula. Of these the most remarkable are the Neilgherries (q.v.) or Blue Mountains, which cover 600 sq. m. Ootacamund (q.v.), the great sanitarium of s. India, situated in the midst of them, has an elevation of 7,400 ft. Of the minor mountain-ranges of I., the principal are the Sewalik range, near Hurdwar, 3,000 ft.; the Kala or Salt range, adjacent to the Suliman range, 2,500 ft.; the Aravulli, between the basins of the Ganges and the Indus, culminating in Mount Abu 5,000 ft.; the Kattywar Hills, 1,000 to 3,000 ft. in the centre of the Kattywar peninsula; the hills of Bundelcund, 2,000 ft.; and the Rajmahal Hills, 5,000 to 7,000 ft.

The *River-system* of I. is on a grand scale. The Indus (q.v.) traverses the n.w., and drains about 400,000 sq.m. The Ganges (q.v.), on the n.e., together with its tributaries, drains about 500,000 sq.m. The Brahmaputra (q.v.) has a course of more than 600 m. from the point where it leaves the Himalaya to that where it enters the Bay of Bengal. The e. side of I.—the region s. of the Nerbudda, and e. of the Malabar Ghauts—is watered by 18 rivers, the principal being the Godavery, 830 m. long; Kistna, 800; Cauvery (Kaveri), 470; Mahanadi, 520; Brahmini, 400; North Pennar, 350; and the South Pennar, 240. About 20 rivers water the w. side of India. The most noteworthy are the Nerbudda, 800 m. long; the Tapti, 400—both of which flow into the Gulf of Cambay; the Myhi, 350 m.; Luni, 320 m.; Bunnas, 180 m.; and the Bhadro, 130 miles.

Geology.—From observations at different points in I., the general features of its geological structure are known. A staff of geologists commenced more than a quarter of a century ago a geological survey of I., which has since proceeded. They have examined an area several times as large as that of Great Britain, and supplied, for the districts that they have dealt with, an accurate knowledge of the mineral resources of India. See the official *Manual of the Geology of India* (2 vols. 1879).

I. is bounded n.e. by the range of the Himalaya, the great water-shed of central Asia. These mountains consist of granitic rocks which have penetrated the stratified rocks, thrown them up in endless confusion, and metamorphosed them in many places into gneiss, mica-schist, clay-slate, or crystalline limestone. Layers of sandstone and conglomerate extend along the base of the mountains. They are of Miocene age, containing the remains of specie, of camel, giraffe, hippopotamus, sivatherium, elephants crocodile, and tortoise. These are extensively developed in the Sewalik Hills. An immense tract of Post-tertiary alluvial deposits covers the whole of the river-basins of the Ganges and the Indus, stretching across n. I. from sea to sea. The E. and W. Ghauts consist of metamorphic rocks, which are continued across the country n. of the Godavery. Between this transverse band of altered strata and the diluvial deposits of the n. a large tract is occupied with Paleozoic rocks, frequently broken through and covered with different kinds of trap, and in some places overlaid with Secondary and fresh-water Tertiary strata. One of the most important labors of Prof. Oldham and his geological staff has been the exploration of the great Indian coal-fields. They lie in a region bounded n. by the Ganges, and extending s. beyond the Godavery. The coal comes from one geological formation called 'Damuda,' from the river Damodar, in the valley of which the chief beds occur. It differs little geologically from the carboniferous beds of England. Iron, copper, and lead are worked in different parts of India. Salt is obtained from the Salt range; also by evaporation. Diamonds are still found; and of late the gold mines of I. have awakened interest.

Vegetable Productions.—The vegetation of I. is as varied as its soil and climate, and passes from the flora of a tropical to that of an alpine region. The groves of palm that border the coast, and, in the interior, the umbrageous mango topes, are striking features of Indian scenery. Rice is the chief article of food, and is produced in all parts of the country in which irrigation is practiced. Maize and wheat are the grains cultivated in the N.W. Provinces. Opium is one of the most valuable products of I., and stands next to raw cotton in the value of the export 1879–80, the value of the opium exported was £14,323,000; 1884–5, £10,882,606; 1886–7, £11,070,000. Coffee also, till lately the staple product of Ceylon, is grown in India. Tea cultivation is now carried on with success in Ceylon, Assam, and several hill-districts. Cinchona, introduced from S. America 1860, has been naturalized with great success, at a cost of £61,719. 'The return,' Mr. Markham says, 'represents a value which is simply incalculable and without price;' a cheap supply of quinine being one of the most certain means of averting the fevers that prevail in the hot and moist parts of India. As a commercial speculation, the measure ultimately will prove highly remunerative. The growth of cotton has been much extended since the American war of secession; the finest is produced in Berar. The rhea, or jute plant, is grown in Assam and Bengal, and has recently given rise to an important trade. India-rubber is another important product of Assam, the demand for which is increasing. Tobacco is now largely grown. Of late, great attention has been given to the importance of preserving the Indian forests. The destruction of the woods was found to give rise to destructive floods, and to render the water-supply uncertain and capricious during the dry season. The Indian cultivators have been rapidly improving in prosperity, and with that improvement there has been increasing demand for timber for house construction and furniture—a demand further augmented by the requirements of the railways. To protect existing forests, and extend the area of the timber-producing districts, the Indian Forest Conservancy Dept. was organized, the main objects of which were the definition and demarkation of reserved forests, and the prevention of jungle fires—that is to say, of the native practice of burning forests for cultivation, and the cutting and clearing away of creepers round the young trees. The system of preparing candidates for forest service was commenced 1867, when the first examination was held by the civil-service examiners. Since that time, a large number of officers who have studied forestry in England, Germany, and France have been sent to I., and great satisfaction has been expressed with their work.

Animals.—The domesticated animals are horses, asses, mules, oxen, buffaloes, sheep, and elephants. Of wild beasts, the most formidable is the Bengal tiger. The other beasts of prey are leopards, wolves, jackals, panthers, bears, hyenas, lynxes, and foxes. Of poisonous snakes, the cobra da capello, or black-hooded snake, the cobra manilla, and sand snake are the most common. The number of people killed by wild beasts is notable. Govt. returns 1880–88 show a yearly fluctuation of between 2,840 and 2,618. In 1887, 2,618 persons and 61,021 head of domestic cattle were killed by wild beasts, 19,740 persons died from snake bites, and £16,542 were paid as rewards for killing wild beasts, of which £3,791 were paid for snakes.

Climate.—In a country extending over 26° of latitude—one extremity of which runs far into the torrid zone, and the other terminates in a range of lofty mountains rising far above the line of perpetual snow—a country embracing within its ample circumference lowland plains, elevated plateaux, and alpine regions, the climate must differ greatly. Hindustan proper may be said to have three well-marked seasons—the cool, the hot, and the rainy. The cool months are Nov., Dec., Jan., and a part of Feb.; the dry hot weather precedes, and the moist hot weather follows the periodical rains. The climate of south I. is greatly regulated by the Monsoons (q.v.). The central table-land is cool, dry, and healthy. At Ootacamund, on the Neilgherries, 7,300 ft. above sea-level, the mean annual temperature is 57° F.; at Madras, 83°; Bombay, 84°; Calcutta, 79°; Bangalore, 74°; and at Delhi, 72°. The fall of rain varies greatly in different parts. A map of the Indian rainfall given by Mr. Markham in his Report, 1873, shows that in the whole of north-eastern I., from the valley of the Sutlej to the mouths of the Irrawaddy, including the sub-Himalayan countries, Assam, and British Burmah, and between the W. Ghauts and Coromandel coast, it exceeds 75 inches. In the interior of the Deccan it is less than 30, and in Multan and Sinde less than 15 inches. The remainder of I. is between the extremes represented by these damp and dry belts, but is, as compared with Europe, an arid country. Hence the necessity of tanks and irrigation canals to supply moisture to the soil, and to obviate the danger of dry seasons.

Inhabitants.—Three races widely distinguished from each other inhabit India. In the n.e. are Mongols, resembling the Tibetans, and Burmese; in the s. Dravidians, the relation of whom to other great branches of the human family is still a subject of dispute; and in the n.w., Aryans. It is supposed that at a remote epoch a branch of the Aryan (q.v.) race entered the peninsula from the n.w., established themselves first in the Punjab, and thence gradually diffused themselves over the whole of n. and central I., imbuing the subject population more or less completely with their religious system and their language, and thus forming the Hindus. Tribes still inhabiting the mountainous districts and jungles are supposed to be outstanding islands of the aboriginal population that resisted the tide of Hindu conquest and civilization. The Hinduizing influence extended feebly, if at all, into the Deccan, the great majority of whose inhabitants, therefore, are supposed not to belong ethnologically to the Aryan race.

Prof. Friedrich Müller thus distributes the Indian races according to their languages (see also the *Geographical Magazine*, 1878, Jan.).

A. *Mongols*—(1) Tibetans, subdivided into Tibetans Proper, in upper terraces of the Himalaya; and s. of them, the sub-Himalayan tribes, speaking Lepcha, Kiranti, Limbu, Murmi, etc. (2) The Birman or Lohitic races, speaking Burmese of Aracan, Kooch, Dhimal, Bodo, Garo, Miri, Singpho, Naga, Kuki, etc. (3) The Thai, or Siamese races, speaking Ahom, Khamti, etc.

B. *Dravidians*, subdivided into—(1) The Munda branch—Kol (in Chota Nagpore), Sontal, Ramusi, Warali, Bheel, etc. (these are now usually separated from the Dravidians, and made a *Kolarian* group). (2) The Dravida branch proper—Tamul, Telinga, Canarese, Malayala, Tulava, Toda, Gond, Khond, Rajamahal, Kol, Brahui (in Beloochistan). (3) The Singhalese branch in Ceylon, including the Veddahs. The Tamul, Telinga, Canarese, Malayala, Tulava, and Singhalese are spoken by cultivated races; the other languages by rude hill-tribes.

C. *Aryans*, subdivided into—(1) The races of Dardistan and the n.w. frontier, including the Siah-posh Kafirs, and other rude tribes. (2) The Hindus, including the cultivated races speaking the following languages: Cashmiri, spoken in Cashmere; Punjabi, in the Punjab; Hindi, in various dialects sometimes described as languages, spoken in the w. plain of the Ganges and Mulwa; Sindhi, in Sinde; Cutchi, in Cutch; Gugerati, in Gugerat; Mahrati, in the n.w. Deccan, s. of the Vindhya Mountains; and Bengali, spoken in the plain of the Ganges, e. of the bend of the river Rajmahal; and the Orya, Assami, and Nepauli, all resembling the Bengali, and spoken in Orissa, Assam, and Nepaul by the Hindu section of the inhabitants. For an account of the connection of these languages with the old Prakrit dialects of India, see SANSKRIT: PALI.

The word Hindu is used in various senses, and it is important to guard against the confusion that may thence arise. It is applied (1) to the people speaking the Hindi dialect of the N.W. Provinces; (2) to the Aryans of n. India; (3) To the cultivated races of India, both Aryan and Dravidian, who profess the Hindu religion, and have been influenced by the Indian civilization common to both. The cultivated peoples of India professing the Hindu religion, or Hindus in the third sense, not only differ in language in different provinces of I., but in customs and dress. The Mohammedan population on the other hand, in all parts of India, wear the same dress, affect the same customs, and speak one language—Hindustani or Urdu, a dialect which sprang up at the Mohammedan court of Delhi, and which is a highly cultivated form of Hindi intermixed with a large number of Persian and Arabic words. It is the language generally used by the British government in official business. In several provinces, however, attempts have been recently made to substitute for it the local languages, such as Sindhi and Assami, many of which have received little literary cultivation.

The following facts about I. 1879–80 give some idea of the literary importance of the native languages. In the N.W. Provinces, out of 541 books published, only 41 were English. In the Madras Presidency, out of 775 published, 68 per cent. were in the vernaculars; and 17 per cent. English. In Bombay Presidency, out of 1,097 books and pamphlets issued, 990 were in Oriental languages, 103 in English, and 2 each in Latin and Portuguese. In Bengal, the total number was 1,391, of which 983 were published in Calcutta. In the Punjab, 926 publications were issued, of which 676 were in the vernacular. In Assam appeared 12 books; Mysore, 27; while Bera had none.

In I. there are rude tribes belonging to the Mongol, Dravidian, and Aryan races. The Siahposh Kafirs and kindred tribes of Dardistan are undoubted Aryans, who know nothing of Hindu culture. The Mongols n. and e. of the Terai, in the same way, have none of the culture of Bhotan, Tibet, and China. They have caused much trouble on the Assam frontier, where several districts are excluded from the operation of regular laws, and the deputy-commissioner of Assam now holds an annual meeting of the hill-tribes. The Angami Nagas 1854–65 made 19 raids into the plains, and killed 236 people; but in the latter year a military post was occupied in their country, and the raids have ceased. The hill-tribes of the Dravidian race also are in the lowest stage of savagery. Among the most important and best known of them are the Bheels, in Candeish; and the Khonds and Koles, who inhabit Orissa. The former were wont to live by plunder, and used to burst out of their jungles like tigers, committing most frightful excesses; but in 1825, after various methods of subduing them had been unsuccessfully tried by the British govt., it was resolved to tempt them into military service. A Bheel corps was raised, into which all the wilder spirits were drafted, and the result has been a decided improvement in the habits and disposition of the rest of the people. Roads have now been made through their country, and property is safe. The Khonds and Koles, however, are perhaps a more interesting race, since they have preserved more completely what may be regarded as the primitive religion of Hindustan. Forced into the jungles and mountains of central I. by the victorious advance of the Aryan race from the n.w., they have preserved (in part at least), in their almost inaccessible retreats, the grim religion that prevailed in the peninsula before Brahmanism was heard of. That religion may be briefly characterized as Devil-worship. The Khonds sacrifice only to malignant deities, such as Siva the Destroyer, the goddess Kali, and the God of the Earth, whom they seek to propitiate by human sacrifice, principally of children, who, however, are not taken from their own race, but kidnapped from neighboring tribes. Successful efforts have been made by the British govt. to suppress these practices.

To the present civilized inhabitants of I., who, though generally a mixed race of Dravidian and Aryan origin, now form many distinct nations, no general statement can apply. The acute but timid Bengali resembles little the warlike Sikh of the Punjab, or the fierce Afghan of Rohilcund; and the patient weaver of Dacca is wholly unlike the high-spirited Rajpût of central India. The Sikh is a born soldier, who despises the Hindu, and hates the Mussulman. He cares nothing for caste, and is brave, faithful, and independent. The Mohammedans of I. are degenerate followers of the Prophet, and their religion is a strange mixture of the doctrines of the Koran with the idolatry of Asia. The Parsees, a mercantile and educated class, seated at Bombay and along the w. coast of I., are descendants of the fugitive fire-worshippers of Persia (see PARSEES). Of the morality of the civilized races of I. in general, Mr. Markham says that, whatever may be said of the larger towns, the residents of villages are 'singularly temperate as a rule, chaste, honest, peaceful, singularly docile, easily governed, and patient.'

Two of the most striking peculiarities of the social condition of the Hindus are the institution of Caste (q.v.) and the *Village-system.* The latter is very simple. A village in Hindustan does not mean a collection of houses at a particular spot, but corresponds rather to what is called a township in the United States. It is a district embracing an area of some hundreds or thousands of acres of land, and is under the administration of native functionaries, the principal of whom is the *potail* (head-inhabitant), a kind of chief magistrate, who superintends the affairs of the community, settles disputes, attends to the police and the collection of taxes. Among the functionaries are the *curnum*, who keeps a register of the produce and the names of the proprietors, and draws up all deeds of sale, transfer, etc.; the Brahman, or village priest; and the schoolmaster. Besides these, every village has its astrologer, smith, carpenter, potter, barber, doctor, dancing-girl, musician, and poet, all of whom are rewarded for their labors out of the produce of the village lands. 'Under this simple form of municipal government, the inhabitants of the country have lived from time immemorial. The boundaries of the village have been but seldom altered; and though the villages themselves have been sometimes injured, and even desolated by war, famine, and disease, the same name, the same limits, and even the same families, have continued for ages. The inhabitants give themselves no trouble about the breaking up and division of kingdoms; while the village remains entire, they care not to what power it is transferred, or to what sovereign it devolves; its internal economy remains unchanged; the potail is still the head-inhabitant, and still acts as the petty judge and magistrate, and collector or renter of the village.'

Religion.—Hinduism or Brahmanism is the religion of the great majority of the people of I., and Mohammedanism comes next. Of the 253,982,595 inhabitants of India. British and fendatory (1881), 187,937,450 were Hindus, 50,121,585 Mohammedans, 6,426,511 fire-worshippers, 3,418,884 Buddhists, 1,862,634 Christians (see INDIA, BRITISH, *Christianity in*), 1,853,426 Sikhs, 1,221,896 Jains, 85,397 Parsees, 12,009 Jews, others 952,029. In Bengal there are nearly 22,000,000 Mohammedans to 45,000,000 Hindus; in the Punjab, 11,000,000 to 9,000,000 Hindus; in Central India, 500,000 to 7,800,000. Buddhism at one period prevailed throughout I.; it is now confined to Bhotan, Ceylon, and the Burmese frontier. For several leading forms of religion prevalent among the natives of I., see BUDDHISM: MOHAMMEDANISM: PARSEES: SIKHS; what we shall here specially consider is that variety of creeds which is derived from Brahmanic sources, and known as the Hindu religion, or Hinduism. The term Hinduism, however, must not be taken as restricted to those forms of the Brahmanic religion which now exist; we have to look upon it as comprising all the phases of this creed from its earliest period.

We may divide Hinduism into three great periods, which for brevity may be called the Vedic, Epic, and Purânic periods; as our knowledge of the Vedic period is derived from the sacred books called the *Veda;* of the Epic period, from the epic poem called the *Râmâyana*, especially from the great epos, the *Mahâbhârata;* while for the Purânic period the chief source of our information is that class of mythological works known under the name *Purânas* and *Tantras*. It is necessary here to guard against attempting to connect dates with the earlier of those periods. It has been common for writers on this subject to assign thousands of years before the Christian era as the starting-point of various phases of Hindu antiquity; others, more cautious, marked the beginnings of certain divisions of Vedic works with B.C. 1,200, 1,000, 800, and 600 years. The truth is, that while Hindu literature itself is almost without known dates, owing either to the peculiar organization of the Hindu mind, or to the convulsions of Indian history, the present condition of Sanskrit philology does not afford the scholar requisite resources for any chance of success in such chronological speculations. For this question of Hindu chronology, see more particularly VEDA. In the meantime, the utmost stretch of assumption which in the actual condition of Sanskrit philology it is permitted to make is, that the latest writings of the Vedic class are not more recent than B.C. 2d c. A like uncertainty hangs over the period at which the two great epic poems of I. were composed, though there is reason to surmise that the lower limits of that period did not reach back of the Christian era. The Purânic period, all scholars are agreed to regard as corresponding with part of European mediæval history.

If the *Rig-Veda*—oldest of the Vedas, and probably the oldest literary document in existence—coincided with the beginning of Hindu civilization, the popular creed of the Hindus, as depicted in some of its hymns, would reveal not only the original creed of this nation, but throw a strong light on the original creed of humanity itself. Unhappily, however, the imagination, indulging in such an hypothesis, would have as little foundation to work on as that which would fix the chronological position of this Veda. The Hindus, as depicted in these hymns, are far removed from the starting-point of human society; nay, they may fairly claim to be ranked among those already civilized communities experienced in arts, defending their homes and property in organized warfare, acquainted even with many vices which occur only in an advanced condition of artificial life: see VEDA. Yet in examining the ideas expressed in the greatest number of the Rig-Veda hymns, it cannot be denied that they are neither ideas engendered by an imagination artificially influenced, nor such as have made a compromise with philosophy. The Hindu of these hymns is essentially engrossed by the might of the elements. The powers which turn his awe into pious subjection and veneration are—*Agni*, the fire of the sun and lightning; *Indra*, the bright, cloudless firmament; the *Maruts*, or winds (see MARUT); *Sûrya*, the sun (see SÛRYA); *Ushas*, the dawn (see USHAS); and various kindred manifestations of the luminous bodies, and nature in general. He invokes them, not as representatives of a superior being, before whom the human soul professes its humility; not as superior beings themselves, which may reveal to his searching mind the mysteries of creation or eternity, but because he wants their assistance against enemies—because he wishes to obtain from them rain, food, cattle, health, and other worldly goods. He complains to them of his troubles, and reminds them of the wonderful deeds that they performed of yore, as if to coax them into acquiescence and friendly help. 'We proclaim eagerly, *Maruts*, your ancient greatness, for the sake of inducing your prompt appearance, as the indication of (the approach of) the showerer of benefits;'

or: 'Offer your nutritious viands to the great hero (*Indra*), who is pleased by praise, and to *Vishnu* (one of the forms of the sun), the two invincible deities who ride upon the radiant summit of the clouds as upon a well-trained steed. *Indra* and *Vishnu*, the devout worshipper glorifies the radiant approach of you two who are the granters of desires, and who bestow on the mortal who worships you an immediately receivable (reward), through the distribution of that fire which is the scatterer (of desired blessings).' Such is the strain in which the Hindu of that period addresses his gods. He seeks them, not for his spiritual, but for his material welfare. Ethical considerations are therefore foreign to these instinctive outbursts of the pious mind. Sin and evil, indeed, are often adverted to, and the gods are praised because they destroy sinners and evil-doers; but one would err in associating with these words our notions of sin or wrong. A sinner, in these hymns, is a man who does not address praises to those elementary deities, or who does not gratify them with the oblations they receive at the hands of the believer. He is the foe, the robber, the demon—in short, the borderer infesting the territory of the 'pious' man, who, in his turn, injures and kills, but, in adoring Agni, Indra, and their kin, is satisfied that he can commit no evil act. Yet we should be likewise wrong did we judge of those acts of retaliation by the standard of our own ethical laws. So far, indeed, from reflecting unfavorably on the internal condition of the Hindu community, the features of which may be gathered from these hymns, they seem, on the contrary, to bespeak the union and brotherhood which existed among its members; and the absence, in general, of hymns which appeal to the gods for the suppression of internal dissensions or public vices, bears, apparently, testimony to the good moral condition of the people whose wants are recorded in these songs.

It may be imagined that the worship of elementary beings like those above mentioned was originally a simple and harmless one. By far the greatest number of the Rig-Veda hymns know of but one sort of offering made to these gods; it consists of the juice of the Soma or moon-plant, which, expressed and fermented, was an exhilarating and inebriating beverage, and for this reason, probably, was deemed to invigorate the gods, and to increase their beneficial potency. It was presented to them in ladles, or sprinkled on the sacred Kusa grass. Clarified butter, too, poured on fire, is mentioned in several hymns as an oblation agreeable to the gods; and it may have belonged to this, as we hold, primitive stage of the Vedic worship.

There is a class of hymns, however, in the Rig-Veda which depart materially from the simplicity of the conceptions above referred to. In these, which we conceive to be of another order, this instinctive utterance of feeling makes room for the language of speculation; the allegories of poetry yield to the mysticism of the reflecting mind; and the mysteries of nature becoming more keenly felt, the circle of beings which overawe the popular mind becomes enlarged. Thus, the objects by which Indra, Agni, and the other deities are propitiated, become gods themselves; Soma, especially, the moon-plant and its juice, is invoked as the bestower of all worldly boons. The animal sacrifice—the properties of which seem to be more mysterious than the offerings of Soma, or of clarified butter—is added to the original rites. We quote a few verses from the second book of the Rig-Veda, which may illustrate the essential difference between this order of hymns and those previously alluded to. It is the horse of the sacrifice which is invoked by the worshipper, and its properties are praised in the following strain:

'Thy great birth, O Horse, is to be glorified; whether first springing from the firmament or from the water, inasmuch as thou hast neighed, for thou hast the wings of the falcon and the limbs of the deer. Trita harnessed the horse which was given by Yama, Indra first mounted him, and Gandharba seized his reins. Vasus, you fabricated the horse from the sun. Thou, horse, art Yama: thou art Aditya, thou art Trita by a mysterious act: thou art associated with Soma. The sages have said there are three bindings of thee in heaven,' etc.

Mystical language like this doubtless betrays the aberration of the religious instinct of a nation; but it also reveals the fact that the pious mind of the Hindus was no longer satisfied with the adoration of the elementary or natural powers; it shows religion endeavoring to penetrate into the mysteries of creation. This longing we find, then, expressed in other hymns, which mark the beginning of the *philosophical creed of the Vedic period.* The following few verses may tend to illustrate the nature of this third class of hymns, as they occur in the oldest Veda: 'I have beheld the Lord of Men,' one poet sings, 'with seven sons [i e., the seven solar rays], of which delightful and benevolent (deity), who is the object of our invocation, there is an all-pervading middle brother, and a third brother [i.e., Vâyu and Agni, the younger brothers of Aditya, the sun], well fed with (oblations of) clarified butter. They yoke the seven (horses) to the one-wheeled car [i.e., the orb of the sun, or time, or a year]; one horse [i.e , the sun], named seven, bears it along: the three-axled wheel [i.e., the day with its three divisions, or the year with three seasons—hot, wet, and cold; or time—past, present, and future] is undecaying, never loosened, and in it all these regions of the universe abide. . . . . Who has seen the primeval (Being) at the time of his being born? What is that endowed with substance which the unsubstantial sustains? From earth are the breath and blood, but where is the soul? Who may repair to the soul to ask this? Immature (in understanding), undiscerning in mind, I inquire of those things which are hidden, (even) from the gods, (what are) the seven threads which the sages have spread to envelop the sun in whom all abide?' Another poet sings: 'Then there was no entity or non-entity; no world, or sky, or aught above it; nothing anywhere in the happiness of any one, involving or involved; nor water deep or dangerous. Death was not, nor was there immortality, nor distinction of day or night. But THAT breathed without afflation, single with her (*Swadhâ*) who is within him. Other than him, nothing existed (which) since (has) been. . . . . Who knows exactly, and who shall in this world declare, whence and why this creation took place? The gods are subsequent to the production of this world, then who can know whence it proceeded, or whence this varied world arose, or whether it uphold itself or not? He who in the highest heaven is the ruler of this universe, does indeed know; but not another one can possess this knowledge.'

As soon as the problem implied by passages like these was raised in the minds of the Hindus, Hinduism must have ceased to be the pure worship of the elementary powers. Henceforward, therefore, we see it either struggling to reconcile the latter with the idea of one supreme being, or to emancipate the inquiry into the principle of creation from the elementary religion recorded in the oldest portion of Vedic poetry The first of these efforts is shown principally in that portion of the Vedas called *Brâhmana* (see VEDA), the second in the writings termed *Upanishad* (see UPANISHAD). In the *Brâhmanas*—a word of the neuter gender, and not to be confounded with the similar word in the masculine gender, denoting the first Hindu caste—the mystical allegories which now and then appear in what we have called the second class of Vedic hymns, are not only developed to a considerable extent, but gradually brought into a systematic form. Epithets given by the Rig-Veda poets to the elementary gods are spun out into legends, assuming the shape of historical narratives. The simple and primitive worship mentioned in the hymns becomes highly complex and artificial. A ponderous ritual, founded on those legends, and supported by a far more advanced condition of society, is brought into a regular system, which requires a special class of priests to be kept in proper working order. Some of the Vedic hymns seem to belong already to the beginning of this period of the Brâhmana worship, for in the second book of the Rig-Veda several such priests are enumerated in reference to the adoration of Agni, the god of fire; but the full contingent of 16 priests, such as is required for the celebration of a great sacrifice, does not make its appearance before the composition of the Brâhmanas and later Vedas. Yet, however wild many of these legends are, however distant they become from the instinctive veneration of the elementary powers of nature, and however much this ritual betrays the gradual development of the institution of castes —unknown to the hymns of the Rig-Veda—there are still two features in them, which mark a progress of the religious mind of ancient India. While the poets of the Rig-Veda are concerned chiefly in glorifying the *visible* manifestations of the elementary gods—in the Brâhmanas, their ethical qualities are put forward for imitation and praise. Truth and untruth, right and wrong—in the moral sense which these words imply—are not seldom emphasized in the description of the battles between gods and demons;

and several rites themselves are described as symbolical representations of these and similar qualities of the good and evil beings, worshipped or abhorred. A second feature is the tendency, in these Brâhmanas, of determining the *rank* of the gods, and as a consequence, of giving prominence to one special god among the rest; whereas in the old Vedic poetry, though we may discover a predilection of the poets to bestow more praise, for instance, on Indra and Agni, than on other gods, yet we find no intention, on their part, to raise any of them to a supreme rank. Thus, in some Brâhmanas, *Indra*, the god of the firmament, is endowed with the dignity of a ruler of the gods; in others, the *sun* receives the attributes of superiority. This is no real solution of the momentous problem hinted at in such Vedic hymns as are quoted above, but it is a semblance of it. There the poets asks 'whence this varied world arose'—here the priest answers that 'one god is more elevated than the rest;' and he is satisfied with regulating the detail of the Soma and animal sacrifice, according to the rank which he assigns to his deities.

A real answer to this great question is attempted, however, by the Hindu theologians who explained the 'mysterious doctrine,' held in utmost reverence by all Hindus, and laid down in the writings known as *Upanishads.* It must suffice here to state that the object of these important works is to explain, not only the process of creation, but the nature of a supreme being, and its relation to the human soul. In the Upanishads, Agni, Indra, Vâyu, and the other deities of the Vedic hymns become symbols to assist the mind in its attempt to understand the true nature of one absolute being, and the manner in which it manifests itself in its worldly form. The human soul itself is of the same nature as this supreme or great soul: its ultimate destination is that of becoming re-united with the supreme soul, and the means of attaining that end are not the performance of sacrificial rites, but the comprehension of its own self and of the great soul. The doctrine which at a later period became the foundation of the creed of the educated—the doctrine that the supreme soul, or (the neuter) Brahman, is the only reality, and that the world has a claim to notice only so far as it emanated from this being, is already clearly laid down in these Upanishads, though the language in which it is expressed still adapts itself to the legendary and allegorical style which characterizes the Brâhmana portion of the Vedas. *The Upanishads became thus the basis of the more enlightened faith of India.* They are not a system of philosophy, but they contain all the germs whence the three great systems of Hindu philosophy arose; and like the latter, while revealing the struggle of the Hindu mind to reach the comprehension of one supreme being, they advance sufficiently far to express their belief in such a being, but at the same time acknowledge the inability of the human mind to comprehend its essence. For the different periods which must be distinguished in the composition of these works, and for the gradual development of the general ideas briefly adverted to here, see UPANISHAD.

The EPIC period of Hinduism is marked by a similar development of the same two creeds, the general features of which have here been traced in the Vedic writings. The popular creed strives to find a centre round which to group its imaginary gods, whereas, the philosophical creed finds its expression in the groundworks of the *Sânkhya*, *Nyâya*, and *Vedânta* systems of philosophy. In the former, we find two gods in particular who are rising to the highest rank, Vishnu and Siva; for as to Brahmâ (masculine form of Brahman), though he was looked upon, now and then, as superior to both, he gradually disappears, and becomes merged into the philosophical Brahma (neuter form of the same word), which is a further evolution of the 'great soul' of the Upanishads. In the *Râmâyana*, the superiority of Vishnu is admitted without dispute; in the great epos, the *Mahâbhârata*, however, which, unlike the former epos, is the product of successive ages, there is an apparent rivalry between the claims of Vishnu and Siva to occupy the highest rank in the pantheon; but Sanskrit philology will have first to unravel the chronological position of the various portions of this work, to lay bare its groundwork, and to show the gradual additions that it received, before it will be able to determine the successive formation of the legends which are the basis of classical Hindu mythology. Yet it seems clear that even already during this Epic period there is a predilection for the supremacy of Vishnu; and that the policy of incorporating rather than combating antagonistic creeds, led rather to a quiet admission, than to a warm support of Siva's claims to the highest rank. For the character of these gods, for the relation in which the conception of these beings stands to that of the Vedic time, for the new ideas which they impersonate at the Epic period, and for the group of mythological beings connected with both of them, see their respective titles. We point, however, to one remarkable myth, as it will illustrate the altered position of the gods during the Epic period. In the Vedic hymns, the immortality of the gods is never matter of doubt; most of the elementary beings are invoked and described as everlasting, as liable neither to decay nor death. The offerings that they receive may add to their comfort and strength; they may invigorate them, but it is nowhere stated that they are indispensable for their existence. It is, on the contrary, the pious sacrificer himself who, through his offerings, secures to himself long life, and, as it is sometimes hyperbolically called, immortality. And the same notion prevails throughout the oldest Brâhmanas. It is only in the latest work of this class, the *S'atapatha-Brâhmana*, and especially in the Epic poems, that we find the inferior gods as mortal in the beginning, and as becoming immortal through exterior agency. In the *S'atapatha-Brâhmana*, the juice of the Soma plant, offered by the worshipper, or at another time clarified butter, or even animal sacrifices, impart to the gods this immortality. At the Epic period, Vishnu teaches them how to obtain the *Amrita*, or beverage of immortality, without which they would go to destruction; and this epic *Amrita* itself is merely a compound, increased by imagination, of the various substances which in the Vedic writings are called or likened to *Amrita*, i.e., a 'substance that frees from death.' It is obvious, therefore, that gods like these could not strike root in the religious mind of the nation. We must look upon them as the gods of poetry rather than of real life; nor do we find that they received any of the worship which was allotted to the two principal gods, Vishnu and Siva.

The philosophical creed of this period adds little to the fundamental notions contained in the Upanishads; but it frees itself from the legendary dross which still imparts to those works a deep tinge of mysticism. On the other hand, it conceives and develops the notion, that the union of the individual soul with the supreme spirit may be aided by penances, such as peculiar modes of breathing, particular postures, protracted fasting, and the like; in short, by those practices which are systematized by the Yoga doctrine. The most remarkable Epic work which inculcates this doctrine is the celebrated poem *Bhagavadgîtâ*, wrongly considered by European writers as a pure Sânkhya work, whereas *S'ankara*, the great Hindu theologian, who commented on it, and other native commentators after him, have proved that it is founded on the Yoga belief. The doctrine of the reunion of the individual soul with the supreme soul, was necessarily founded on the assumption, that the former must become free from all guilt affecting its purity before it can be re-merged into the source whence it proceeded; and since one human life is apparently too short for enabling the soul to attain its accomplishment, the Hindu mind concluded that the soul, after the death of its temporary owner, had to be born again, in order to complete the work which it had left undone in its previous existence, and that it must submit to the same fate repeatedly until its task is fulfilled. This is the doctrine of *metempsychosis*, which, in the absence of a belief in Divine grace, is a logical consequence of a system which holds the human soul to be of a nature derived from the being of an absolute God. The beginning of this doctrine may be discovered in some of the oldest Upanishads; but its fantastical development belongs to the Epic time, where it pervades the legends, and affects the social life of the nation. See METEMPSYCHOSIS.

The PURÂNIC period of Hinduism is the period of its decline, so far as the popular creed is concerned. Its pantheon is nominally the same as that of the Epic period. Brahmâ, Vishnu, and Siva remain at the head of its imaginary gods; but whereas the Epic time is generally characterized by a friendly harmony between the higher occupants of the divine spheres, the Purânic period shows discord and destruction of the original ideas whence the Epic gods arose. Brahmâ withdraws, in general, from the popular adoration, and leaves Vishnu and Siva to fight their battles in the minds of their worshippers for the highest rank. The elementary principle which originally inhered in these deities is thus completely lost sight of by the followers of the Purânas. The legends of the Epic poems relating to these gods become amplified and distorted, according to the sectarian tendencies of the masses; and the divine element which still distinguishes these gods in the Râmâyana and Mahâbhârata, is now more and more mixed with worldly concerns and intersected with historical events, disfigured in their turn to suit individual interests. Of the ideas implied by the Vedic rites, scarcely a trace is visible in the Purânas and Tantras, the text-books of this creed. In short, the unbridled imagination which pervades these works is neither pleasing from a poetical, nor elevating from a philosophical point of view. Some Purânas, it is true—for instance, the *Bhâgavata*—make in some sense an exception to this aberration of original Hinduism; but they are a compromise between the popular and the Vedânta creed, which henceforward remains the creed of the educated and intelligent. They do not affect the worship of the masses as practiced by the various sects; and this worship itself, whether harmless, as with the worshippers of Vishnu, or offensive, as with the adorers of Siva and his wife Durgâ, is but an empty ceremonial, which, here and there, may remind one of the symbolical worship of the Vedic Hindu, but, as a whole, has no connection whatever with the Vedic scriptures, on which it affects to rest. It is this creed which, with further deteriorations through the lapse of centuries, is still the main religion of the masses in India. See PURÂNA.

The philosophical creed of this period, and the creed still preserved by the educated classes, is derived from the Vedânta philosophy. It is based on the belief of one supreme being, which speculation endeavors to invest with all the perfections conceivable by the human mind; but its true nature is, nevertheless, declared to be beyond the reach of thought, and, on this ground, it is defined as not possessing any of the qualities by which the human mind is able to comprehend intellectual or material entity. See VEDÂNTA.

Hindu Sects.—The sects which arose during the third period of Hinduism, suppose that their worship is countenanced by the Vedas; but their worship derives its real origin from the *Purânas* (q.v.) and *Tantras* (q.v.). There are three chief divisions of these sects—the adorers of Vishnu, of Siva, and of the wives or female energies of these gods. See VAISHNAVAS: SAIVAS: SÂKTAS. There are also some minor sects.

For the philosophy, literature, architecture, etc., of I., see SANSKRIT LITERATURE: MÎMÂNSÂ: NYÂYA: SÂNKHYA: VEDÂNTA. For the history of I., see INDIA, BRITISH.

IN'DIA, BRITISH: collective name for those parts of Hither and Further India placed under the administration of the British viceroy or gov.gen. of India. It does not include Ceylon, which, though a British possession, has a separate government; but it extends along the e. coast of the Bay of Bengal to 10° s. lat., and thus includes part of Further

India or Indo China. The following table shows area and pop. of the portion of India under direct British control at the census of 1881: for the native states, see INDIA, NATIVE STATES OF.

Provinces.	English sq. m.	Pop.
Under Gov.Gen. of India—		
Ajmere	2,711	460,722
Berar	17,711	2,672,673
Coorg	1,583	178,302
Andaman Islands	880	14,628
Governors—		
Bombay	124,192	16,489,274
Madras	139,900	30,868,504
Lieut.Govs.—		
Bengal	150,588	66,691,456
Northwest Provinces and Oude	106,111	44,107,869
Punjab	106,632	18,850,437
Chief Commissioners—		
Assam	46,341	4,881,426
Central Provinces	84,445	9,836,791
Lower Burmah	87,220	3,736,771
Total under British administration.	868,314	198,790,853

At the same date the pop. of the feudatory states (not including Nepal, Bhotan, or Cashmere) was 55,191,742; so that the aggregate pop. of British India, in the widest sense, was the enormous total of 253,982,595. At the first census 1868–72, the districts directly administered had 185,537,859 inhabitants; and the native states were estimated to have about 50,000,000; giving a total of over 235,500,000. There are about 90,000 English, Scotch, and Irish in India.

These figures, large as they are, fail to give a definite impression of the enormous area and population under British authority in this part of the globe. The districts under direct British administration have an area almost as large as that of the United Kingdom, Austro-Hungary, Germany, France, and Italy, or more than seven times that of the United Kingdom; that of the feudatory states is as large as Norway and Sweden, Spain, Holland, and Belgium together. In population, British and feudatory India together have more than all European states together, omitting Russia only; and more than twice the population of the whole Roman Empire, in its widest extent (120,000,000). British India, in the stricter sense, itself contains nearly one-seventh of the inhabitants of the entire globe.

In 1858, the government of India was transferred from the E. India Company (q.v.) to the crown, the queen was declared sovereign of India, and various changes in administration introduced; in 1877, the queen assumed the title Empress of India (Kaisar-i-Hind). The government of India is in the highest resort invested in a British sec. of state, who is a member of the cabinet; and has an under-sec. and a council of 15 members. The executive government in India is administered by the gov.gen, usually but not officially styled Viceroy, acting under the control of the sec. of state for India. The viceroy, appointed by the crown and holding office on an average about five years, is assisted by an executive council of six ordinary members (appointed by the crown) each of whom has charge of a department of the executive; together with one extraordinary member, the commander-in-chief. This council does not, however, sit as a cabinet. The 'legislative council' is composed of the members of the executive, together with 5 to 12 members appointed by the viceroy.

The time-honored division of British India was into the three great presidencies of Bengal, Madras, and Bombay; but this system, though still retained for military purposes, is administratively antiquated and obsolete, the presidency of Bengal having been split up into several district governments or provinces (see BENGAL). India is now divided into eight great provinces, together with four minor provinces administered by commissioners appointed by the gov.gen. (see table above). Madras and Bombay are under governors appointed by the crown, and have each two councils. Bengal has a lieut.gov. appointed by the viceroy, and a legislative council. The heads of the other provinces, whether ranking as lieut.govs. or chief-commissioners, are appointed by the viceroy; and have no legislative powers. The N.W. Provinces and Oude, formerly distinct, are now for most purposes united; the lieut.gov. of the N.W. Provinces being also chief commissioner of Oude. The Punjab has a lieut.gov.; Assam, the Central Provinces, and British Burmah are under chief commissioners. British territory is divided into regulation territory and non-regulation. The non-regulation provinces are those under chief commissioners; but there are are also non-regulation districts in the provinces administered by lieut.govs. In the non-regulation territory, as a rule, more discretion is allowed to the officials both in the collection of revenue and in the administration of justice. The lieut.govs. and most of the chief commissioners are chosen from the Covenanted Civil Service. These large provinces (Madras excepted) are further assigned into more than 50 *divisions*, each under a commissioner. The administrative units, however, are the *districts*, of which there are in all British India about 240 Each district, if in regulation territory, is under a collector-magistrate, if in non-regulation territory, a deputy-commissioner. The head of the district has most multifarious and responsible duties; being fiscal-officer charged with collecting the revenue, and civil and criminal judge, besides superintending police, jails, education, sanitation, and roads. Sometimes the executive and judicial departments are in different hands. The subordinate officers are deputy-collectors and assistant-magistrates. The district may be compared to a county or department; and varies in size from an area containing 1,500,000 inhabitants (in Madras) to one with only 200,000. Resident political agents are appointed by the British govt. at the courts of the native princes. The general administration of British India is conducted by members of the *Covenanted Civil Service*, the great majority of whom are British though some natives of India hold appointments. The service is recruited from the successful candidates at competitive examinations in London. The *Uncovenanted Civil Service*, appointments to which are made by the authorities in British India, is composed of Europeans, Eurasians (offspring of native mothers by European fathers), and natives. A large number of Indian towns have obtained municipal institutions, which tend to diffuse the habit of self-government.

Military Force.—In 1858, the army of the E. India Company became the Indian military forces of her majesty. In 1887–8, the strength of the British garrison was fixed at 2,551 officers and 69,240 men. Including the native army the Indian force aggregated 5,192 officers and 183,594 men. The armies of the Hindu feudatory states numbered 275,075 men and 3,372 guns, and those of the Mohammedan states 74,760 men and 865 guns. British I. is divided into three military divisions, which, though named after the three old presidencies of Bombay, Madras, and Bengal, and perpetuating their names, have not exactly the same limits. The British forces are stationed chiefly in the Punjab, and along the valley of the Ganges.

The Police in British India include a force of 145,000 constables or regular policemen, besides the village watchmen who aid them. The minimum age of admission is 17 years, the maximum 21. Each district has a jail and a police superintendent; and the districts are grouped, for police purposes, into circles under deputy-inspectors-general, while the whole police force in each province is under an inspector-general. The constabulary is a purely civil force, subject in all respects, except internal discipline, to the civil authorities.

Administration of Civil Justice.—In 1861, by an act of parliament, high courts of judicature were established at each presidency and in the N. W. Provinces, under the control of a chief-justice, and as many other judges, not exceeding fifteen, as her majesty may appoint. In 1880, there were 1,712,356 civil suits in India, and there can be no doubt that the machinery for litigation supplied by the courts is much employed. Sir George Campbell, however, fears that the tendency to uphold the bare doctrines of law—the literal fulfilment of contracts alleged to have been entered into by ignorant and improvident people—leads to great hardship in cases which affect poor men and benefit the rich and litigious. The Civil Procedure Code of India offers facilities for litigation which are apt to be abused. Sir George Campbell, in illustration of the views entertained of legal proceedings by some classes of Indian litigants, gives the following account of a litigation between the members of a family originally belonging to one of the hill-tribes. One of the parties, after litigating through all the courts of India, got a decree in the highest court. But there was an appeal to the privy council, and the suitor's funds were exhausted. So they caught an old man, carried him to the top of the hill, and sacrificed him to propitiate the gods who rule the decisions of the privy council. The Civil Procedure Code worked such mischief among the Sontals, that the people were exasperated, and had to be removed from the operation of laws applicable generally in Bengal.

Revenue, Expenditure, etc.—The annexed table shows the gross amount of the public revenue and expenditure of British India, with the surplus or deficiency of revenue in each of the under-mentioned years:

Years ended.	Gross Revenue.	Total Expenditure.	
		In India.	In England.
1869	49,262,691	43,225.587	10,181,747
1870	50,901,081	42,791,013	10,591,013
1871	51,413,686	41,015.502	10,083,004
1872	50,110,215	40,486,818	8,127,694

Years ended.	Gross Expenditure.		Surplus (+) or Deficiency (–) of Revenue.	
	Exclusive of Public Works Extraordinary.	Including Public Works Extraordinary.	Exclusive of Public Works Extraordinary.	Including Public Works Extraordinary.
1869	52,036,721	53,407,334	–2,774,030	–4,144,643
1870	50,782,412	53,382,026	+ 118,669	–2,480,945
1871	49,930,696	51,098,506	+1,482,990	+ 315,180
1872	46,986,038	48,614,512	+3,124,177	+1,495,703

The gross amount of the public revenue and expenditure in each province in British India, inclusive of receipts and expenditure in England, for the year ending 1884, Mar. 31, is shown below:

	Revenue.	Expenditure.
India under the gov.gen.	£13,673,282	£19,557.188
Bengal	17,808,030	7,165,645
Northwest Provinces and Oude	9,018,969	3,907,592
Punjab	4,810,825	3,646,904
Central Provinces	1,575,363	1,031,077
British Burmah	2,850,036	1,610,552
Assam	856,528	615,759
Madras	9,599,434	8,060,303
Bombay (including Sinde)	11,269,169	9,708,863
England	265,785	15,036,042
Totals	£71,727,421	£70,339,925

The budget for 1885–6 gave an estimated revenue of £72.090,400, and a total expenditure of £71,582.300; 1886–7 revenue £76,081,000, expenditure £76,021,000; 1887–8 revenue $77,460,000, expenditure £77,443,000. The latter estimate of revenue included £22,938,000 from land, £15,432.000 roads and railroads, £8,893,000 opium monopoly, £6,605,000 salt taxes, £3,716,000 stamp duties, £4,225,000 excise duties, £2.957,000 provincial rates, £2,025,000 postal and telegraph services and the mint,

£1,688,000 irrigation rates, and £1,233,000 customs duties; and of expenditure £22,110,000 for roads and railroads, £19,197,000 military purposes, £13,180,000 civil depts., £4,412,000 interest on debt, £2,441,000 irrigation expenses, £2,262,000 post office telegraph, and mint expenses, and £903,000 miscellaneous purposes. In India the govt. has always been considered the owner of the soil, and the actual cultivators pay a rent or tax, in collecting which different systems have hitherto been followed in different parts of the country, known as the *Zemindari Settlement*, *Ryotwar*, and *Mouzawar* or *Village Settlement*. The latter is the oldest and the simplest system. Each village under this arrangement was regarded as a separate municipality, and each was assessed by the govt. at a particular sum, for the due payment of which the headman of the village was considered responsible. The individual distribution of the burden of taxation rested with the village authorities; and govt., provided it received its regular dues through the *potail*, interfered no further. The origin of the Zemindari and Ryotwar Settlements requires some explanation. When the English first entered on the administration of the country, they found that the practice of native sovereigns, their predecessors, had been to farm out the land revenues of the country to the nobles of the court, or to wealthy bankers, who annually paid a fixed amount into the royal treasury, and collected the govt. dues on their own behalf, from the actual cultivators of the soil. These farmers of the revenue were termed Zemindars. The question for the English rulers arose, whether or not they were to consider these men as proprietors. In Bengal and Bahar they were so recognized, and confirmed in their position, the govt. holding them responsible for the payment of the dues on their estates, and regarding the cultivators on the farms as their tenants. This was Lord Cornwallis's Zemindari Settlement. In Madras and Bombay, the opposite course was pursued. Claims of the middlemen, or farmers of the revenue, to enjoy any proprietary rights were totally ignored; and under Sir Thomas Monro, the ryotwar system was introduced, by which govt. makes a separate settlement with each individual cultivator or *ryot*, who is recognized as the virtual proprietor of the land, or tenant direct under govt., so long as he pays the land-tax annually charged on his estate or farm. In 1871, under the administration of Lord Mayo, there was created a new dept. of revenue, agriculture, and commerce. It has charge of all questions relating to land revenue and settlements, works of agricultural improvement, silks and fibres, forests, commerce, trade, and the industrial arts. It has also under its charge the collection of statistics, placed under another new dept., the statistical survey of India. A series of leading questions has been issued by the director-gen., showing exactly what information is required from residents in the different districts. A connected account of each district will be prepared from the returns, and these will be in turn condensed by the director-gen. into an imperial statistical account of India. 'This survey,' says Mr. Markham, 'forms an epoch in statistical enterprises, and its practical results will be most important.'

Currency.—In British India accounts are kept in rupees, annas, and pie—16 annas going to the rupee, and 12 pie to the anna. The coins are rupees (value 2*s.* sterling), and half and quarter and half-quarter rupees, in silver; and in copper, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{12}$ of an anna. The currency of India, however, is chiefly silver, of which a large amount is coined annually. The coinage bears the impress of Queen Victoria as Empress of India in the native costume. In 1861, an act was passed by the govt. of India providing for the issue of a paper currency by means of promissory-notes. The amount of notes in circulation in 1877 was £11,641,654.

The public debt of British India, in India and England (1872) amounted to £112,314,760, on which the interest paid was £5,336,329. In 1877, the total amount of the debt was £127,320,159, of which £71,923,126 had been taken up in India, and £55,397,033 in England. In 1885 the debt was £162,454,748.

Commerce.—The ordinary ocean commerce 1887 amounted to £69,710,000 imports and £90,110,000 exports, an increase in 10 years of £13,100,000 imports and £22,800,000 exports. The ordinary sea-borne imports of merchandise amounted to £58,696,071, and of treasure on private account £11,048,322; total £69,744,393; exports of merchandise £88,439,578, private treasure £1,684,421; total £90,123,999, The imports of govt. stores and treasure amounted to £3,115,889, exports £77,461. The total imports of gold were £2,828,561, silver £8,219,761; exports gold £656,492, silver £1,063,933. The frontier imports amounted to £5,141,038 and exports £346,334. The distribution of this trade among the principal countries was as follows:

Countries.	Imports.	Exports.
Great Britain	£46,769,519	**£34,298,610**
China	2,187,958	**13,433,881**
France	803,515	**7,723,015**
Italy	425,541	**5,279,166**
United States	1,170,331	**3,248,104**
Belgium	295,253	**3,608,645**
Austria-Hungary	723,864	**2,639,432**
Mauritius	1,656,485	**881,523**
Egypt	68,607	**2,548,411**

The exports included raw cotton £13,470,000, rice £8,830,000, wheat £8,620,000, hides and skins £5,140,000, tea £4,880,000, raw jute £4,860,000, indigo £3,690,000, cotton manufactures £2,430,000, wool £1,340,000, coffee £1,510,000, opium £11,070,000, and cotton twist and yarn £3,410,000; and the imports, cotton manufactures £29,164,885, hardware and metals £5,554,495, raw and manufactured silk £2,177,111, sugar £2,080,539, railway material and rolling-stock £1,435,124, machinery £1,371,459, and coal £1,316,615. The total tonnage entered and cleared at all ports of British I. (1887) was 7,172,193; vessels entered

5,140, cleared 5,444; coasting vessels entered 112,371, cleared 108,321.

Roads and Railways.—Since 1836 great trunk-roads have been constructed in various parts of India: the most remarkable is from Calcutta to Peshawer, 1,400 m. long. The importance of these great works has now diminished, owing to the extension of a great railway system. The chief railways now open are the E. Indian, Calcutta to Delhi; the Indian Peninsula, which forms a branch to Bombay; the Delhi, Punjab, and Sinde, which will ultimately connect the system with the mouth of the Indus; the Bombay and Baroda, which runs n. from Bombay; the Madras railway, running s.e. to Madras, and thence s.w. to Beypûr on the Coromandel coast. Up to 1881, the total capital raised for constructing railways was £134.200,581; of which £67,329,179 were for guaranteed lines, and £32,-293,415 to state lines. The net earnings on both were £6,952,714, of which £3,110,824 were for the guaranteed railways. In 1888, Mar., 14,383 m. of railroad were in operation, 2,487 under construction, and 355 more being laid out. Of the completed roads 3,911 m. belonged to guaranteed companies, 654 to assisted companies, 8,994 to the govt., and 824 to native states. The passenger traffic (1887) was 95,411,779, freight 20,195,677 tons, receipts £18,460,000, cost of operation £9,100,000, amount spent on railroad construction to beginning of the year £170,498,910, of which the govt. spent £78,358,404 in building railroads and £35,048,368 in guaranteed interest on subsidized lines. The recently completed Sinde-Pishin and Bolan Pass strategic lines cost more than £8,000,000. In 1887 there were 30,034 m. of telegraph lines, with 86,891 m. of wire in use, and 2,534,685 messages were passed.

Irrigation Works and Canals.—We have already referred to the importance of irrigation in India, and the great attention given to the subject in late years. Great works have recently been undertaken in the basins of the Indus, Ganges, Mahanaddy, and Tapti, and in other parts, to supply water to the rich but parched soil, and thus extend the area of cultivation. Several of the canals are adapted for navigation as well as irrigation—e.g., the Sirhind canal, connected with the Sutlej, 500 m. long, opened 1882: it irrigates 780,000 acres, of which 260,000 are in native states. To give the greatest possible efficiency to the action of the govt. in relation to the extension of canals, an inspector-gen. of irrigation works has been appointed, with irrigation secretaries in the various provinces.

Disease in India.—The climate and sanitary condition of India give rise to pestilences which at intervals carry desolation over the country, while disease in its worst form is never absent. Hospitals, richly endowed and admirably regulated, supported by govt. and by private munificence, are in all the large towns; and great efforts are constantly made to bring the benefits of medical skill and knowledge within reach of the poorer classes. In all parts of the country dispensaries have been opened, where medicines are given out, and patients advised. Much of the disease is due to bad water and bad drainage; and where a new water-supply has been introduced, and drains have been made, as in Calcutta, the improvement in the health of the inhabitants has been marked. Nearly 2,000,000 persons were vaccinated 1872. Mortality is fearfully aggravated by the passion of the people for pilgrimages. All ages and sexes traverse vast areas, and die by hundreds on the route. The Mohammedan pilgrims go in numbers to Mecca, Kerbela, and Jerusalem; and a large proportion never return.

Emigration and Colonization.—From the table at the head of this article, it appears that the population of British India is very unequally distributed. While Bengal resembles a city in the density of its population, the adjoining provinces of Assam and Burmah, though no less fertile, have a very small number of inhabitants. The recurrence of famines in the overpeopled district shows the importance of encouraging emigration. The tea-planters have of late attracted crowds into Assam and other districts. The number introduced into Assam (1879) was 24,712; (1878) 43,061. In Burmah there were 96,297 coolie immigrants 1879–80. The distant emigration from British India has become very important in recent years, and to regulate it the Indian Emigration Act (1871) was passed, consolidating all previous laws for the protection of the emigrant coolies. One condition with respect to emigration from India to the British colonies is, that there shall be 40 women to every 100 men. In 1874, the number of Indian emigrants who left for various foreign destinations reached the total of 29,243; whereas in 1884, there was a total emigration of only 17,936 Indian coolies from Calcutta, Madras, and the French ports. As a rule, the Indian emigrants improve their condition by service in the West Indies. It is thought that, except to a few limited districts, colonization from England must ever be impracticable in India on account of the unfavorable climate; for the European race settled in the country rapidly degenerates, and in a few generations becomes effete, and bodily and mentally enervated. A constant stream of British capital, however, and fresh directing energies in its application, is the great want, and would secure, as nothing else can, the development of its unlimited resources. Indigo and sugar factories, and coffee and tea plantations, have been the principal undertakings in which independent British capital and energy have been hitherto embarked, and the results have been most satisfactory.

Christianity in India.—India was one of the earliest fields of Christian missions. Tradition assigns it as the scene of the apostle Thomas's labors and martyrdom. Whether this was the case or not, we find a Syrian church planted in Malabar in s. India, which undoubtedly had a very early origin. The Jesuit missionaries, from the middle of the 16th c. onward, had large success in India: see XAVIER. The total number of Christians in India, according to the census of 1881, was 1,862,634, of whom 963,059 were Rom. Catholics; 353,712 Anglicans; 20,034 Scotch Presb.; 23,135 Episc.; 138,200 Bapt., Congl., and other Protestants; 2,142

Greeks and Armenians; and 365,235 not specified. The Rom. Catholics are mainly in Portuguese and French territory, and in the native states of Travancore, Cochin, and Pudukota (largely descendants of the old Nestorian converts). The earliest Prot. missionaries in India came from Holland and Denmark: with the latter mission the eminent Schwartz was connected. England's first missionary effort was put forward by the Soc. for the Propagation of the Gospel, and the Christian Knowledge Soc., which commenced in the beginning of the 18th c., by aiding the Danish mission already established in s. India. Subsequently, the E. India Company adopted the policy of excluding missionaries altogether from their territories; but since the beginning of this century, when these restrictions were withdrawn, a great work has been done, in which many denominations are represented. In Bengal, 16,000 ryots profess Protestantism. In Chota Nagpore, within the last 20 years, German missionaries have converted 20,000 Koles. In Oude and Rohilcund, there are 2,000 converts. In southern I. the numbers are much greater. The entire number of Indian Protestants in I. (1852) was 128,000; (1862) 213,182; (1872) 318,363. Mr. Markham, who gives these figures in his Report for 1873, speaking of the Prot. missions, says: 'The government of India cannot but acknowledge the obligations under which it is laid by these 600 missionaries, whose blameless example and self-denying labors are infusing new vigor into the stereotyped life of the great population placed under English rule, and are preparing them to be in every way better men and better citizens of the great empire in which they dwell.' In the Proclamation to the Princes, Chiefs, and People of India, read in the principal cities, 1858, Nov. 1, it was declared, 'that none shall be in anywise favored, none molested or disquieted, by reason of their religious faith and observances, but that all shall alike enjoy the equal and impartial protection of the law.' The fullest toleration in matters of faith exists throughout British India. Fanaticism only, as when it seeks to enforce the burning of widows or Suttee (q.v.), or offers human beings in sacrifice, is curbed by the ruling power. There is no exclusively endowed state-church, but govt. continues to pay the state grants made to Hindu temples and to Mohammedan mosques. Clergymen of the Church of England, the Church or Scotland, and the Rom. Cath. Church, are retained on the govt. establishment as civil or military chaplains. There are Church of England bishops at Calcutta, Madras, and Bombay.

Education.—The education of the people is based on the system set forth in a dispatch of Sir Charles Wood, 1854, July 19. The main principle of the dispatch was that European knowledge should be diffused through the languages understood by the great mass of the people; but that the teaching of English should always be combined with careful attention to the study of the vernacular languages. With regard to the wealthier classes, it was declared that the time had arrived for the establishment of universities, conferring degrees, and based on the model of the Univ. of London: they were not to be places of education, but to test the value of education obtained elsewhere, and to confer degrees in arts, law, medicine, and civil engineering. Such universities have been established in Calcutta, Madras, and Bombay; and since 1859, govt. schools have been opened for instruction of all classes of the people. In each province there is now a director of public instruction, assisted by school inspectors, one of whom has under his care one circle or subdivision of the province. Normal schools for the training of teachers have been established, and attempts are being made to spread the education of women. In 1886 there were 16,048 govt. schools of all kinds with 863,772 pupils; 61,183 missionary and other schools with 1,662,835 pupils, partly supported by the govt.; and 45,412 schools with 812,454 pupils, without govt. aid. There were also 3 universities with 3,802 students, 106 colleges for males, 2 colleges for females, 285 special schools (medical, technical, industrial, etc.) with 12,667 students, 33 schools for females, and a Mussulman college. The population of school ages was (5–10) 32,000,000 and (10–20) 43,000,000, of which 3,332,851 were receiving instruction. Of the total expenditure for education, £2,424,-395, one-third was paid out of govt. and provincial revenues.

Distribution of Languages, Occupations, etc.—The census of 1881 makes 110 language groups, many of which are closely allied. The leading languages are: Hindustani, spoken by 82,500,000; Bengali, 39,000,000; Telugu, 17,-000,000; Mahrati, 17,000,000; Punjabi, 15,700,000; Tamil, 13,000,000; Guzarati, 9,600,000; Canarese, 8,350,000; Ooriya, 7,000,000; Malayalam, 5,000,000; Sindhi, 3,700,000; Burmese, 2,700,000. The average density of population in all India is 184 per sq. m.; in the native states, 108 per sq. m. The density varies from 441 in Cochin and 403 in the N.W. Provinces to 79 in Rajputana and 43 in Burmah. In British India, 70,000,000 are agriculturists; 20,000,000 workers in all materials, cotton, gold, pottery, etc., 2,800,000 domestic servants (only 650,000 of these women); 800,000 officials; 620,000 clergy and priests; 7,300,000 laborers.

Books on India.—Dr. W. W. Hunter's *Imperial Gazetteer of India* (9 vols. 1881); James Mill's *History of British India* (1858); J. Talboys Wheeler's *History of India*, or his *Short History* (1880); Lassen's *Indische Alterthumskunde;* also the works of Elphinstone, Elliot, and Meadows Taylor. The Afghan War and the Indian Mutiny have been treated by Sir John Kaye. Cunningham has written a history of the Sikhs, and Grant Duff of the Mahrattas. There is much valuable information on India and things Indian in Dalton's *Ethnology of Bengal;* in the various works of Dr. W. W. Hunter; in reports on the *Moral and Material Progress of India*, and other official blue-books. See also *History of the French in India* (1868), by Col. Malleson; *England's Work in India*, by W. W. Hunter; *India in* 1880, by Sir R. Temple; *History of the Indian Mutiny*, by T. R. C. Holmes (1884).

History.—Before the dawn of history, India seems to have been wholly occupied by non-Aryan peoples in various stages of civilization (see above, *Inhabitants*). The first great epoch in Indian history is the incursion of the Aryan race, and their gradual settlement in the Punjab and the Northwest. Gradually they spread across the great river-belt s. of the Himalayas, the basins of the Indus and the Ganges; and this became the peculiar home of the Aryans, and the scene where their civilization was worked out: see ARYANS. This period is represented by the earliest Indian literature (see above, *Religion*). Then came action and reaction between the Hindu and the aboriginal civilization, faith, and manners. To B.C. 6th c. are referred the rise of Buddhism (see BUDDHA) and the establishment of Buddhist kingdoms; but Buddhism gradually disappeared about the 12th c., yielding to modern Hinduism. The Mohammedan invasions mark the period 1000 to 1765; the last period is that of the English supremacy.

The oldest history of India is entirely legendary; it is shrouded in mythical narratives, which, though of high interest, in a religious and archæological view, do not enlighten us as to the dates of the personages concerned, nor as to the *reality* of the facts which they record. Thus, the solar and lunar dynasties spoken of in the epic poems, the *Râmâyana* and *Mahâbhârata*, and others mentioned in the *Purânas*, are beyond the reach of history. The first reliable date in ancient Hindu history is that of *Chandragupta*, whom the Greeks call *Sandrocottus;* he reigned about B.C. 300. To the same dynasty belonged the king *Asôka*, prominent in Buddhist history after his conversion about B.C. 244.

The first Mohammedan dynasty was the *House of Ghizni* (1001–1167). The Sultan Mahmûd, sovereign of the small state of Ghizni (q.v.), was the first conqueror who permanently established the Mohammedan power in India. In 1186, the House of Ghizni became extinct, and the Hindu princes fell one by one before a succession of Mohammedan dynasties, whose names and dates are as follow: *Slave Kings of Delhi* (1206–88).—One of these sovereigns, Altmish, who ascended the throne 1211, added the greater part of Hindustan Proper to his dominions; and in his reign the Mongol Genghis Khan devastated the n.e. parts of India. In Balin's reign (about 1284) the Mongols made a second irruption into Hindustan, but were totally defeated by the monarch's eldest son, the heroic Mohammed, who fell in the action. The *Khiljis and House of Toghlak* (1288–1412).—In 1290, the Mongols made their third and last great irruption into Hindustan, but were almost annihilated by Zafir Khan, whose name became so proverbial among the Mongols, that when their horses started, they would ask them if they saw the ghost of Zafir Khan. In 1397, during the reign of the last of the Toghlak kings, the Tartar Timur, or Tamerlane, sacked Delhi, and proclaimed himself emperor of India. *The Syuds* (1412–50). *The House of Lodi* (1450–1526). To the kings of this dynasty succeeded the *Great*

Moguls or House of Timur (1526–1707. Baber, who had for 22 years been sovereign of Cabul, invaded India for the fifth time toward the end of 1525 (see BABER), and after doing battle with Sultan Ibrahim on the plain of Paniput, 1526, Apr., entered Delhi in triumph, and established himself emperor of the Mohammedan dominions in India, in right of his ancestor Timur: he died 1530, and was succeeded by his son Humayun. The celebrated Akbar (q.v.), son of Humayun, became emperor 1556, and reigned nearly 25 years. His son ascended the throne 1605, and his grandson, Shah Jehan, 1627. In 1658, Shah Jehan was imprisoned by his son, the famous Aurungzebe (q.v.), who usurped the imperial power. This remarkable man raised the Mogul empire to the height of greatness and splendor, and was the ablest and most powerful, as well as the most ambitious and bigoted, of his race. The death of Aurungzebe took place 1707, and the decay of the empire, which had begun a few years before, proceeded rapidly. 'A succession of nominal sovereigns, sunk in indolence and debauchery, sauntered away life in secluded palaces.' Viceroys of the Great Mogul formed their provinces into independent states; while Hindu and Mohammedan adventurers carved out kingdoms with the sword. The dismemberment of the Mogul empire opened a wide field for ambition and enterprise to the nations of Europe. The Venetians, the Genoese, the Portuguese, and the Dutch had by turns traded with India; and 1602, the English appeared on the scene: see EAST INDIA COMPANY.

In 1653, Madras was raised into a presidency, and 1668, the island of Bombay—the dowry of Charles II.'s queen, the Infanta Catherine of Portugal—was transferred by the crown to the E. India Company. The invasion of the Persian, Nadir Shah, 1738, who sacked Delhi, slaughtered its inhabitants, and carried away the Peacock Throne, and vast treasure, hastened the fall of the Mogul empire.

1745–61.—Great jealousy existed between the English and French, who also had established themselves in India. On the declaration of war between England and France, hostilities began in the Madras presidency, nor were they terminated by the peace of Aix-la-Chapelle, 1748. The struggle in the Carnatic was continued with ardor, under pretext of supporting the claims of rival native princes to sovereignty. Clive (q.v.), first and most famous name on that great muster-roll of British soldiers and statesmen who have thrown such lustre on the British occupation of India, laid the foundation of his country's supremacy in the East. His memorable defense of Arcot 1751, and his subsequent victories, broke the spell of French invincibility. The next memorable event was the siege and capture of Calcutta, 1756, June 20, by Suraja Dowlah, grandson of Ali Verdi Khan, and gov. or subahdar of Bengal. The English prisoners, 146 in number, were confined in the small garrison prison or Black Hole, of whom only 23 survived till the morning. Clive quickly took command of an expedition fitted out at Madras, recovered Calcutta (1757), and, assisted by Admiral Watson, prosecuted the war with his usual vigor, till after a hollow peace and a renewal of hostilities, Suraja Dowlah was completely defeated by Clive in the memorable battle of Plassey, 1757, June 23. Meer Jaffir, Suraja Dowlah's commander-in-chief, was placed on the musnud by the English, who from this time ruled Bengal as well as Bahar and Orissa.

Political Progress of E. India Company (1764–73).—After the battle of Buxar, 1764, with Sujah Dowlah, the usurping vizier of Oude, the Mogul emperor, Shah Alum, who had previously been in the power of the defeated Sujah Dowlah, claimed the protection of the British. He confirmed the Company in their possessions, and granted them the collectorate or perpetual *dewannee* of Bengal, Bahar, and Orissa, on condition of receiving the sum of £260,000 per annum. During the subsequent financial difficulties of the company, they repudiated this and other conditions which they had guaranteed to Shah Alum; and the cost to the company of maintaining their authority and standing army prevented them from undertaking public works and developing the resources of the country. The Regulating Act was passed 1773, and a gov.gen. was appointed. In 1765, Clive purged the Indian govt. of oppression, extortion, and corruption, and from that, his last visit, dates the purity of the administration of the British eastern empire.

Administration of Warren Hastings (1773–85).—Warren Hastings was the first gov.gen. of India. A new power, the Supreme Court of Judicature, appointed by the Regulating Act, came into operation during his administration. This council arrogated to itself authority exceedingly embarrassing to the gov.gen., to whom it was very hostile. Hastings used unscrupulous, and at times utterly unjustifiable means to replenish the E. India Company's exchequer, but, by his energy and talent, he averted dangers that threatened to annihilate British supremacy in India. The powerful Mussulman sovereigns, Hyder Ali and the Nizam of the Deccan, assisted by French officers, combined with the Mahrattas against the English; Sir Eyre Coote broke up the confederacy, and defeated Hyder Ali 1781. In 1782, the Supreme Court of Judicature was deprived of its independent powers, and the policy of Hastings was successful both in the council and in the field. In 1784, Pitt instituted the Board of Control.

Marquis Cornwallis (1786–93).—Lord Cornwallis, who succeeded Warren Hastings, was both gov.gen. and commander-in chief. His administrative measures were important, and consisted most notably in fixing the land-rent throughout Bengal on that system of land tenure known as Zemindari, and reforming the judicial system. In 1790, Lord Cornwallis, with the Nizam, the Mahrattas, and the Rajah of Coorg for allies, made war on Tippoo, Sultan of Mysore, who had invaded Travancore, then under British protection. Terms were dictated to Tippoo at his capital, Seringapatam, and he was compelled to cede half his dominions to the company.—The Marquis Cornwallis was succeeded by Sir John Shore (1793–98), whose rule was in no respect memorable.

Marquis Wellesley (1798–1805).—The British empire in the East, like that of Napoleon I. in Europe, could be maintained only by constant fighting; fighting was the price paid for empire, and to stand still was to retrograde. Tippoo Sahib broke his faith by intriguing against the English both with the French and with native princes: his bad faith cost him his crown and his life. In 1799, May, Seringapatam was captured, and Tippoo slain. The Hindu dynasty, displaced by Hyder Ali, was restored, and the administration carried on most successfully for the youthful rajah by Col. Wellesley (afterward Duke of Wellington). In the famous battle of Assaye, 1803, he defeated the Mahrattas under Scindia; and the victories of Lord Lake in northern I. extended considerably the dominions of the company. The policy of the Marquis Wellesley was, however, too aggressive to suit the views of the E. India Company, and he was superseded by Lord Cornwallis, who returned to India only to die. Lord Minto succeeded, 1806-13.

Nothing of much imporance occurred until the Marquis of Hastings became gov.gen. (1813–23). He waged war against the Pindaris, who were entirely suppressed. He had previously defeated the Gurkhas; and before the close of his brilliant administration, he made the British power supreme in India. The civil administration of the Marquis of Hastings was directed to the amelioration of the moral condition of the people of India.

The next administrations were those of Earl Amherst, and Lord William Bentinck. The first was signalized by the Burmese war, the second by the suppression of sutti and the Thugs.

Earl of Auckland (1835-42).—This gov.gen. is known chiefly by his unjustifiable and disastrous Afghan policy, ending in the horrible massacre of British troops in the Khyber Pass: see AFGHANISTAN.

Earl of Ellenborough (1842-44).—The 'army of retribution' proceeded to Cabul soon after Lord Ellenborough took the reins of government. Cabul was sacked, several public buildings razed to the ground, after which the country was evacuated. The conquest of Sinde by Sir Charles Napier, followed by its annexation, also belongs to this administration.

Sir Henry Hardinge (1844–48).—Lord Ellenborough having been recalled by the E. India directors, from alarm at his martial tendencies, Sir Henry Hardinge was sent to take his place. The attention of the new gov.gen. was, however, soon diverted from works of peace to do battle with the bravest people of India. Ever since the death of the British ally, Runjeet Singh, 1839, the Punjab had been in a state of disorganization. The Sikhs, uneasy at British conquests in Sinde and Gwalior, and remembering British discomfiture at Cabul and the Khyber, resolved to anticipate the attack that they considered imminent. The first Sikh war began on the part of the Punjabees by the passage of the Sutlej, and was followed by the terrible battles of Moodkee, Ferozeshah, Aliwal, and Sobraon, in which, after very hard fighting, the Sikhs were defeated with great slaughter. The war resulted in a British resident and British troops being stationed at Lahore, though the boy prince, Dhuleep Singh, was acknowledged as Maharajah. The Cis-Sutlej states, the Jullundur Doab, and the alpine region between the Beas and the Sutlej were annexed.

Marquis of Dalhousie (1848–55).—This administration is memorable for the commencement of superb public works, cheap uniform postage, railways, telegraphs, improvements in government, and social progress generally; a second Sikh war (ending in the crowning victory of Gujerat, 1849, Feb. 21), a second Burman war (finished 1852); and the annexation of four kingdoms, the Punjab, Pegu, Nagpûr, and Oude.

Viscount Canning (1856–62).—When Lord Canning took the reins of government, everything promised peace and prosperity. With the early days of 1857 came the first mutterings of the storm that was to sweep over so large a portion of British India. At the commencement of the year, chupattees (cakes of flour and water) were circulated mysteriously through the N.W. Provinces; treasonable placards appeared at Delhi, and other suspicious occurrences gave warning of Mohammedan disaffection or conspiracy. The Enfield rifle and its greased cartridge was at this time put into the hands of the sepoys without explanation or precaution; and Gen. Anson, commander-in-chief, snubbed caste, and was against all concession to the 'beastly prejudices' of the natives. The mutiny broke out at Meerut (32 m. from Delhi), where there were stationed European troops amounting to about 1,800 men, besides sappers and miners, and about 2,900 native soldiers. Apr. 23, the skirmishers of the 3d native cavalry, on parade, refused to touch the new cartridges, though permission was given to break off the end with the fingers. The 85 mutineers were tried, and sentenced to imprisonment. On the evening of the day after the sentence, the native troops rose, liberated their comrades and the felons of the jail, shot down their officers, and the doomed station was given up to conflagration and massacre. The next day, May 11, the Meerut mutineers reached Delhi. There were no European troops to oppose them, and the city fell into their hands, but was retaken by Gen. Archdale Wilson the following September. Nana Sahib of Bithoor, whose claims as the adopted son of the Pishwah had not been recognized by the British govt. fanned the insurrection. At the end of June, Gen. Wheeler was forced to surrender to him at Cawnpore, and, in spite of the promise of safe conduct to Allahabad, all the men were immediately massacred. The women were butchered July 15, by order of the Nana, when he heard of Havelock's march from Allahabad, which had begun July 7. The Europeans in the Residency at Lucknow were besieged June 30. Five days afterward, the commandant, Sir Henry Lawrence, died of his wounds, and his place was taken by Brigadier Inglis, who bravely held out till he was relieved on Sep. 25 by the heroic

Havelock. The final relief was achieved by Sir Colin Campbell; and the city was again in complete possession of the British. By 1858, June, no city or fortress of any importance remained in the hands of the mutineers. Oude was entirely reduced by the beginning of 1859. The able rebel leader, Tantia Topee, a Mahratta Brahman, was taken, tried by court-martial, and hanged. During the mutiny, valuable assistance and protection were received from many native chiefs. Honors were, in consequence, bestowed upon Scindia, the Maharajah of Gwalior; Holkar, Maharajah of Indore; the Nizam, and others. The trial of the king of Delhi resulted in his conviction as 'a false traitor to the British government, and an accessory to the massacre in the palace.' It was the fate of the last representative of the E. India Company to sentence the last Great Mogul and heir of the House of Timûr 'to be transported across the seas as a felon.' He was transported accordingly, accompanied by his queen and son, to Tongu, in Pegu, where he died 1862. The transfer of the govt. of I. to the British crown, and the new constitution above referred to, were the immediate consequences of the mutiny.

The Earl of Elgin (1862-63).—No event of importance occurred during the brief administration of Gov.Gen. Lord Elgin, who died 1863, Nov.

Sir John Lawrence (1863-65).—Toward the close of Lord Elgin's administration, a Mohammedan rising was apprehended in n.w. India, and it was considered most desirable that the new viceroy should have practical experience of Indian affairs. Sir John, afterward Lord Lawrence, was accordingly appointed viceroy. He conducted the govt. with great prudence and zeal; though unfortunate events occurred during his term of office. A war with Bhotan terminated unsatisfactorily for England 1865; and a dreadful famine occurred in Orissa, caused by a drought and failure of the crops, by which one million and a half of people perished.

Earl Mayo (1863-72).—This administration was inaugurated by a great demonstration at Umballa 1869, Mar. 27, when the Ameer of Afghanistan was received in state, and received a supply of arms and the first instalment of a money subsidy of £120,000 a year. In returning from Rangoon to Calcutta, Lord Mayo visited a convict establishment in the Andaman Islands, and was assassinated there by one of the prisoners, 1872, Feb.: the act had no political significance.

Baron Northbrook (1872).—The chief events of this administration were 'the Bengal famine,' which, however, was anticipated in good time; and the visit of the Prince of Wales to India (1875).

Baron Lytton (1876).—During Lord Lytton's term of office the queen was proclaimed Empress of India (1877), another famine was relieved, and native Indian troops were dispatched to Malta during the Russo-Turkish war 1877-8. An Afghan War began 1878, was interrupted by the peace of Gandamak 1879, May, and recommenced in Sep., when the new English resident at Cabul was murdered, with his suite.

The Marquis of Ripon (1880).—The formation of a liberal ministry led to the resignation of Lord Lytton. After an English defeat in the Afghan war, and one decisive English victory near Candahar, and several smaller English successes, the war was ended, and the troops withdrawn. A contingent of the native Indian army did admirable service in Egypt in the war of 1882; and some of them afterward visited England. Several administrative measures were proposed or passed, which conferred privileges on the natives of India in connection with public appointments and otherwise. Most of these were very unfavorably received by Anglo-Indians, and some were much modified, others withdrawn; but they secured great popularity for the viceroy amongst the natives. Lord Ripon was succeeded 1884, Sep., by the distinguished diplomatist, Lord Dufferin, the chief events of whose administration were the threatened Russian advance on Afghanistan (1885, Mar.), and the annexation of Upper Burmah, 1886, Jan. 4, and Lord Dufferin was succeeded by the Marquis of Lansdowne 1888, Nov.

IN'DIA, FRENCH: comprising nearly 200 sq. m ; pop. (1880) 285,000. The settlements are Pondicherry (the largest), Karikal, and Yanaon, on the e. coast, Mahé on the w. coast, and Chandernagore on the Hooghly.

IN'DIA, NATIVE STATES OF: allied, tributary, and protected states in India, holding various relations to the British government. Two are, nominally at least, entirely independent of British control or interference; these are Nepaul and Bhotan, both on the slopes of the Himalaya. Though not maintaining any direct relations with the British Government of India, they are of course dependent in large measure on British power and forbearance. Cashmere is independent in all that concerns its internal management; but its relations to other states are directly under British control. Sikkim and Gurhwal also are semi-independent. When the native states of India are spoken of, as a rule the feudatory states are meant; and only the latter appear in the official tables.

Native States more or less under English Control.	English sq. m.	Population. 1881.
Baroda	8,570	2,185,005
Central Indian Agency	75,079	9,261,907
Hyderabad	81,807	9,845,594
Mysore	24,723	4,186,188
Rajputana Agency	129,750	10,268,392
In Bengal	36,634	2,845,405
" Northwest Provinces	5,125	741,750
" Punjab	35,817	3,861,683
" Central Provinces	28,834	1,709,720
" Madras	9,638	3,344,849
" Bombay	73,753	6,941,249
Total Native States	509,730	55,191,742

The native states recognizing English supremacy, occupy more than a third of the area over which Britain is supreme, and contain more than one-fifth of its entire population. In the above table they are thus grouped by their connection wiht the British administration.

The relations of their princes to British authority differ very widely. Some are practically independent sovereigns, except that the suzerain power does not permit any of them to make war on one another, or to form alliances with foreign states; while some are under strict control. All govern their states under the advice of an English resident, appointed by the gov.-general. The authority of all the native princes is limited by treaties with the Britist govt.; and the latter rebukes, and if need be, removes a prince who misgoverns. There are in all about 300 feudatory states, great and small; and divided into allied (with 20,000,000 inhabitants), tributary (about 50 with 12,000,000), and protected (about ninety with 18,000,000).

Another classification is according to the religion and race of the dominant dynasty:

I. *Mahratta States;* pop. 6,250,000; revenue £3,300,000; armies, 60,000 men. The chief states are—1. Gwalior (q.v.; pop. 3,116,000); 2 Indore (q.v.; pop. 1,000,000); and 3. Baroda (pop. 2,185,000). These are mainly Hindu in religion; but may conveniently be distinguished from the other Hindu states. See MAHRATTAS.

II. *Hindu States;* nearly 100, pop. 27,000,000; revenue of £8,000,000; native armies, 188,500 men. Of these the chief are—1. Mysore (q.v.; pop. 5,000,000); 2. the Rajputana States, such as Oodeypore or Meywar (pop. 1,200,000), Jeypore (pop. 2,000,000), Jodhpore (pop. 2,000,000), and some 14 smaller states; 3. Madras states, such as Travancore, Cochin, Pudukota; 4. Bombay feudatories, over 30 in number; 5. the Central India Agency, including the Rewa and Bhagelkand Agencies, besides the great Mahratta States and Bhopal; 6. Punjab States, 10 larger and 5 smaller Puttiala being the largest.

III. *Mohammedan States;* pop. 14,000,000; revenue £5,000,000; armies, 75,000 men. The greatest are—1. Hyderabad or the Nizam's Dominions (q.v.; pop. 10,000,000, of whom three-fourths are Hindus, though the dynasty and military power are Moslem); 2. Bhopal (pop. 800,000, nine-tenths Hindus by faith); 3. Bahawalpur (pop. 500,000); 4. Some 19 others, collective pop. of 2,000,000.

IV. *Frontier States;* 1. Cashmere (pop. 1,500,000); 2. the Pathan (Afghan) tribes; 3. Manipur or Cassay (q.v.; pop. 200,000); 4. Bhotan (pop. 200,000?); 5. Nepaul (pop. 2,000,000).

The feudatory states (excluding the frontier states except Cashmere, and without counting small states with an aggregate of about 1,000,000 inhabitants, which have no armies) have together armed forces amounting to 350,000 men, and 4,300 guns. Not more than one-eighth of the Mohammedans of India live in the native states, the vast majority being under direct English rule; and of the inhabitants of the native states, not one-third are Moslems. See respective titles of the states.

IN'DIA, PORTUGUESE: comprising 1,450 sq. m.; pop. 420,000. By far the largest settlement is Goa (q.v.); the others being Daman, n. of Bombay, and Diu in Kattywar.

IN'DIA INK, or IN'DIAN INK: mechanical mixture, and not like the true inks, a chemical compound; in cakes composed of lamp-black and size or animal glue, with a little perfume. The lamp-black must be extremely fine, and is said to be made in China by collecting the smoke of the oil of sesame. A little camphor (about 2 per cent.) also is found in the ink made in China, and is thought to improve it. This substance is used in that country with a brush both for writing and for painting on paper of native manufacture, while, in w. Europe and the United States, it is extensively used for designs in black and white, and all intermediate shades of color. Much curious information on this pigment is in Merimée's treatise, *De la Peinture à l'Huile.*

INDIAN, a. *ĭnd'yan* or *ĭn'dĭ-ăn* [*India*, name of a country: *Indus*, name of a river in India]: pertaining to the Indies, E. or W.: N. a native of India; a Hindu. INDIAN, or RED INDIAN, an aboriginal inhabitant of N. Amer.—so named because Columbus, when he discovered Amer., thought he had reached India. IN'DIA, a. *-dĭ-ă*, of or belonging to India: N. the country. INDIES, n. plu. *ĭn'dĭz*, when applied to Hindustan the name employed is *East Indies;* when applied to Jamaica and the islands in the same seas the name employed is *West Indies*, or *W. India Islands* (see EAST INDIES: WEST INDIES). INDIA-RUBBER, an elastic gum obtained from certain trees, called also *caoutchouc*—which see. IN'DIAMAN, n. a large ship trading to India. INDIAN ARMY: see EAST INDIA ARMY. INDIAN BERRY, a plant, the *Coc'cŭlŭs indĭcus*—which see. INDIAN FIG: see PRICKLY PEAR. INDIAN FIRE, a bright white signal light produced by burning a mixture of 7 parts of sulphur, 2 of realgar (q.v.), and 24 of nitre. INDIAN HEMP: see HEMP, INDIAN: HASHISH. INDIAN PAPER, a delicate absorbent paper, used to take first or finest proofs of engravings. INDIAN RED, a kind of ochre imported from the Persian Gulf, chiefly in small lumps, of a deep red color with a shade of purple. INDIAN SUMMER, in *N. Amer.*, a brief period of warm pleasant weather occurring late in autumn. *Note.*—INDIAN was formerly applied to almost all savage people except negroes.

INDIAN RIVER: tidal channel of Fla., in Brevard and Volusia cos., parallel with the Atlantic coast and for the most part ½ m. from it; 100 m. long, variable in width, usually very narrow, but in places expanded into considerable lakes; is connected by a canal with Halifax river and by Indian River Inlet with the ocean; and is continued s. of Jupiter Inlet as St. Lucie Sound. It is navigable, flows through a beautiful and healthful region, and is highly esteemed as a resort for invalids and sportsmen.

INDIANA, *ĭn-dĭ-ăn′a:* a state; one of the United States of America, 6th in order of admission into the Union, in population and value of agricultural products; 7th in horses, oxen, and other cattle; 9th in hay and milch cows; and 10th in value of manufactures; known colloquially as the 'Hoosier State.'

Location and Area.—I. is in lat. 37° 46′—41° 46′ n., long. 84° 49′—88° 2′ w.; bounded on the n. by Mich. and Lake Mich., e. by O., s. by Ky., w. by Ill.; extreme length, 276 m., greatest breadth 176 m., average breadth 140 m.; 36,350 sq. m. (23,264,000 acres); greatest elevation 600 ft. above the O. river; cap. Indianapolis.

Topography.—Fully two-thirds of the state is a level prairie, the broken and elevated regions being along the O. and Wabash rivers. The interior or region e. of the river-hills comprises fine table-lands. The drainage is by the O., Wabash, Maumee, Kankakee, White, and White Water rivers and their tributaries. The O. river forms the s. boundary, receives the greater portion of the streams of the state, has an irregular course along the state of 380 m., and has numerous river-hills in its valley. The Wabash from its source in O. traverses the state from n.e to s.w., forms the s.w. boundary, has a course of 600 m., and its valley with those of its affluents covers an area of more than 12,000 sq. m. The Maumee is formed by the St. Mary's and St. Joseph's rivers in the n.e., drains a valley of 2,000 sq. m., and flows into O. Eight cos. in the n.w. are drained by the Kankakee, which empties into the Ill. river in Ill. Its valley is swampy, with sandy and barren soil near Lake Michigan. White river, formed by E. and W. Forks, and they in turn by several smaller streams, drains into the Wabash; and White Water river, principal affluent of the Great Miami, drains several cos. in the s.e. The lake system comprises but one large body, Beaver Lake, in Newton co. with an area of 10,000 acres—but there are numerous small and picturesque lakes in Noble, Kosciusko, Marshall, Stark, La Porte, and Knox counties.

Climate.—The temperature is more equable in I. than in Ill. Extremes of heat and cold are confined to the n. cos., the summers are very salubrious, and the winters are short and are accompanied by heavy or long-lasting snows. At Logansport, Cass co., the maximum temperature in the hottest day averages 102°, in the coldest 10°, and the mean annual is nearly 53°. At Michigan City on Lake Mich. the annual rain-fall is 28·75; Logansport 42·8; Indianapolis, the centre of the state, 42·66; and New Albany, on the s. boundary, 40·42.

Geology.—Three-fifths of the state contain Devonian rock and kindred formations, with stretches of the Silurian system beneath. The best agricultural lands are in the valleys of the Wabash, White, and White Water rivers; one-third the surface is covered with choice forests; and the coal measures cover an area of more than 7,000 sq. m., and underlie 17 counties. These measures yield cannel, free-burning bituminous, and block coal, and all are easily worked. Clay co. is the richest coal region in the state and had 38 mines in 1888. Considerable quantities of iron are found; salt springs abound in the coal regions and the e. cos.; and there are valuable quarries of white limestone and sandstone, and seams of brick and peculiar clays. The forest area of 7,500,000 acres yields black walnut, red, white, black, and burr oak, red and sugar maple, hickory, ash, beech, sycamore, linden, elm, whitewood, with some pine, spruce, and hemlock.

Zoology.—Carnivorous wild animals are very scarce, owing to rapid settlement, railroad extension, and lumber-cutting for manufacturing and other purposes. Racoons, skunks, opossums, ground-hogs, and gophers are occasionally met; rabbits, squirrels, and small rodents are quite plentiful; and pigeons, partridges, and wild turkeys are seen in quiet regions but not in sufficient numbers to reward the hunting.

Agriculture.—In 1880 the farm lands covered 20,656,259 acres, valued at $635,236,111, comprised 194,013 farms, gave employment to 331,420 persons, and yielded largely of the general products of the great middle belt of the country. In that year the yield of corn was 115,482,300 bushels, wheat 47,284,853, oats, 15,599,518, tobacco, 8,872,842 pounds, and wool 5,167,498 pounds. In 1885 the products were: corn, 3,720,681 acres, 131,994,000 bushels, $38,278,260 value; wheat 2,518,455 acres, 26,659,000 bushels, $22,926,740; oats 1,014,630 acres, 27,178,000 bushels, $6,794,500; rye 25,256 acres, 278,000 bushels, $163,911; barley 15,398 acres, 266,000 bushels, $146,512; buckwheat 8,737 acres, 89,000 bushels, $57,926; potatoes 94,151 acres, 6,779,000 bushels, $2,440,394; hay 1,468,000 acres, 1,762,000 bales, $13,730,342; and tobacco 13,324 acres, 9,953,000 pounds, $863,395. In 1888 corn showed a decrease in acreage and product, 3,605,694 acres, 125,478,000 bushels, $38,898,180 value; and wheat an increase in both, 2,774,062 acres, 28,879,000 bushels, $27,206,260 value. Other productions 1880 were: sorghum molasses 939,020 gallons, maple molasses 203,134, cider 6,093,233, wine 65,456, vinegar 668,453, apples 6,986,698 barrels, peaches 668,588, grapes 4,029,226 pounds, honey 1,097,636, butter 29,603,647, cheese 833,110, and milk 122,157,633 gallons. The farm animals proper numbered 581,444 horses, 1,360,760 cattle, 1,100,511 sheep, and 3,186,413 swine. In 1888 there were reported 587,709 horses, 60,188 mules, 1,843,473 milch cows and cattle, 1,266,109 sheep, and 3,634,159 pounds of wool; and 1889 the average of oats rose to 1,087,083 and the yield to 36,960,712 bushels.

Manufactures. — I. had (1880) 11,173 manufacturing establishments, employing 69,508 hands, using a capital of $65,742,962, paying in wages $21,960,888, using materials valued at $100,260,892, and yielding products valued at $148,006,411. The chief industry according to capital employed was the manufacture of flour and grist-mill products, which employed a capital of $9,484,123, paid wages $989,087, materials $26,104,637, and received $29,591,397 for products. Next was sawed lumber which employed a capital of $7,948,088, paid wages $1,571,740, materials $9,-

627,097, and received $14,260,830 for products. Then followed foundry and machine-shop products. capital $3,993,758, wages $1,672,520, materials $3,915,164, products $6,833,648; slaughtering and meat packing, capital $3,974,000, wages $494,622, materials $13,645,927, products $15,209,204; agricultural implements, capital $3,231,318, wages $1,010,164, materials $2,182,137, products $4,460,408; carriages and wagons, capital $2,732,417, wages $1,133,233, materials $1,605,103, products $3,998,520; iron and steel, capital $2,283,000, wages $864,921, materials $3,293,073, products $4,551,403; woolen goods, capital $2,273,705, wages $462,681, materials $1,823,390, products $2,729,347; furniture, capital $2,243,250, wages $1,044,367, materials $1,997,177, products $3,909,591; carriage and wagon materials, capital $1,249,008, wages $614,128, materials $1,306,566, products $2,369,723; printing and publishing, capital $1,126,320, wages $689,590, materials $703,984, products $1,832,023; and cars (steam and street), capital $450,000, wages $791,267, materials $3,792,600, products $4,960,500. In 1887 the manufacture of cotton goods employed 776 looms, 33,396 spindles, 720 hands, and used 11,558 bales of material.

Commerce.—I. is (1889) comprised in two internal revenue districts, which collected (1888–9) $5,788,236 against $4,139,150 the previous fiscal year. There is but one port of delivery in the state, Evansville on the O. river. The state is known to have considerable foreign commerce, but it is indirect and passes through the ports of adjoining states, hence no separate record of it is made. The domestic traffic is large, growing rapidly, and severely taxing transportation facilities. Immense quantities of iron ore from the Mo. and Lake Superior mines are carried to the block-coal region to be smelted, many million bushels of grain and other agricultural products are moved annually, and the transportation of hogs and cattle is an enormous item. In Indianapolis alone more than 13,000,000 bushels of corn and more than 8,000,000 of wheat are received and shipped annually. I. was credited (1886) with 55 steam vessels, of 8,198 tonnage.

Mining.—Coal mining is carried on in 17 cos., Clay, Davis, Dubois, Fountain, Gibson, Green, Knox, Parke, Perry, Pike, Posey, Spencer, Sullivan, Vanderburg, Vermilion, Vigo, and Warren, and the mines range in number from 38 in Clay co. to 3 in Gibson. In 1886 the yield of 208 mines was about 3,000,000 tons, and in 1887 the yield of 220 was 3,217,711 tons. Pig-iron mining yielded 12,500 tons 1880, and 6,634 in 1885.

Natural Gas.—Wells of natural gas have been discovered in 22 counties. The first operating company was incorporated 1886; within a year 118 other companies were formed; and in 1888 nearly 200 companies were operating and prospecting. In 1888 there were 125 gas wells in operation, producing about 1,000,000 cubic ft. of gas per day; and in 1889 capitalists began conveying the gas into O. by pipe lines.

Railroads and Canals.—The first railroad, the Madison and Indianapolis, was opened 1847, and 42 m. of track were completed that year. The subsequent growth of mileage has been: 1850, 228; 1855, 1,406; 1860, 2,163; 1865 2,217; 1870, 3,177; 1875, 3,963; 1882, 4,885; 1885, 5,600; 1887, 5,961. In the latter year the capital stock aggregated $128,115,520, bonded debt $125,909,100, unfunded debt $11,867,097, cost of construction and equipment $242,966,915. In 1888 the state assessment on the railroads aggregated $64,211,717. Transportation is afforded also, but not as largely as formerly, by the Wabash and Erie canal, which connects Toledo on the Maumee river with Evansville on the O. river, extends a distance of 467 m., and has 379 m. in I., and by the White Water canal, which connects Lawrenceburg on the O. river with Hagerstown in Wayne co., and extends 75 m.

Religion.—In 1887 there were about 5,000 churches of all denominations in I. The Meth. Episc. Church led with 505 ministers, 1,584 churches, and 143,861 members; followed by the Christians (Disciples), 580 ministers, 675 churches, and 78,950 members; Bapt., 325 ministers, 558 churches, 40,950 members; United Brethren, 339 churches, 24,784 members; Presb., 303 churches, 28,358 members; Lutheran, 274 churches, 33,500 members; and Rom. Cath. 266 churches. Reports for 1888 gave the Bapt. 31 associations, 392 ministers, 547 churches, 47,410 members, 317 Sunday schools, 2,677 officers and teachers, 23,092 pupils, and $883,370 value of church property. The Rom. Cath. Church had the diocese of Fort Wayne, established 1857, in which there were 111 priests, 120 churches (2 more building), 17 chapels, 1 univ., 7 academies for young ladies, 70 schools, 8,096 pupils, 2 orphanages, and 3 hospitals, and of Vincennes, established 1834, in which there were 139 priests, 152 churches, 16 chapels, 2 male religious institutions, 8 female religious institutions, 2 orphan asylums, 3 chapels. 14,000 school pupils, and (est.) Rom. Cath. pop. of 80,000; totals, 250 priests, 272 churches, 33 chapels, 1 univ., 15 academies and religious institutions for females, 6 hospitals, 4 orphanages and orphan asylums, and 22,096 school pupils. The Presb. Church in the U. S. A. reported 8 presbyteries, 195 ministers, 311 churches. 31,778 members, 265 Sunday schools, 3,278 officers and teachers, and 26,171 pupils. The Prot. Episc. diocese of I. contained 36 clergy, 50 parishes and missions, 1,756 families, 4,928 communicants, 444 Sunday-school officers and teachers, 3,742 pupils, and a diocesan library, Howe Grammar School for Boys, St. Stephen's Hospital, Indianapolis Institute for Young Ladies, Barker Hall, and the periodical *Church Worker*. The Meth. Prot. reported 135 ministers, 104 churches, 7,014 members, 108 Sunday schools, 948 officers and teachers, and 6,305 pupils; and the Congl. Churches had 22 ministers, 35 churches, 970 families, 2,275 members, and 3,077 Sunday-school members. More than 20 other denominations had from 1 to 144 churches each.

Education.—In 1880 there were 14 colleges and universities in I., with 137 instructors and 2,545 students, who paid in tuition fees $29,488. The public school system with a fund of $8,936,022 cost that year $4,504,407, of which $3,175,275 were for teachers' salaries. There were 9,380 public school buildings (411 more were built during the year), 708,801 children of school age (6–21), 503,892 enrolled in public schools, 312,143 in average daily attendance, and 13,590 teachers. Beside these there were 12,112 children taught in private schools, and about 20,000 in Rom. Cath. schools. In 1885 the children of school age numbered 740,176, of whom 501,142 were enrolled, and 325,499 in average daily attendance; and the school appropriations were $4,660,000, of which $3,154,083 were for teachers' salaries. The school system was under the management of a gen. supt., the supts. of education in the three principal cities, and the presidents of the State Univ. and the State Normal School. The number of colleges and universities remained the same (14), but the instructors were increased to 167, the students to 3,000, the income to more than $36,000 beside tuition fees, the volumes in the libraries to 81,500, and the value of grounds, buildings, and apparatus to $1,161,000. In 1886–7 there were 14 colleges and universities, 48 instructors and 1,294 students in the preparatory depts., 155 instructors and lecturers, and 1,807 students in the collegiate, $83,792 income from productive funds, $32,566 from tuition fees, 87,650 vols. in the libraries, and $1,772,000 invested in grounds, buildings, and apparatus. I. has one state and 2 city normal schools, with 30 instructors, 371 male and 525 female students, 5,400 vols. in the libraries, and grounds, buildings, and apparatus valued at more than $290,000. The State Normal School at Terre Haute has courses of 3 and 4 years in English and Latin, with special courses for graduates of high schools and colleges. A training school of 8 grades is also attached to the institution. The Ind. Normal College, at Covington, organized 1886, Sep., provides a course comprising ancient and modern languages, professional normal and training instruction, commercial branches, and instruction in the fine arts. Pupils are taught to manufacture most of the apparatus used in laboratory experimenting. A course in the science and art of teaching has been established recently in the State University. Teachers' institutes have been held since 1846, and the State Teachers' Assoc. organized a state reading circle, 1884. There were 12 kindergartens with 2 training schools, 31 teachers, and 446 pupils; 5 were supported by charity, 5 by tuition fees, and 2 otherwise. The Ind. Univ. had 3 instructors and 106 students in the preparatory dept., 19 instructors and 255 students in the under-graduate, 14 endowed professorships, 8,000 vols. in the libraries, $200,000 invested in grounds, buildings, and apparatus, $250,000 in productive funds, $13,000 income from productive funds, $3,600 from tuition fees, $23,000 from state appropriation, $525 from other sources, and $600 in benefactions. The Ind. Univ. is at Bloomington, and is open to both sexes. Purdue Univ. at Lafayette, founded by John Purdue with $150,000, receives the proceeds of the congressional land grant of 390,000 acres, and had

(1886–7) 21 instructors, 211 students, 3,700 vols. in the library, $350,000 invested in grounds, buildings, and apparatus, $340,000 in productive funds, $17,000 income from productive funds, $24,000 from state appropriation, $3,000 from tuition fees, and $44,000 in total income.

The various colleges of liberal arts are: Ind. Univ., Bloomington, chartered 1820, organized 1826 (non-sect.); Wabash College, Crawfordsville, chartered 1834 (Presb.); Concordia College, Fort Wayne, 1850 (Evang. Luth.); Franklin College, Franklin, 1844 (Bapt.); De Pauw Univ., Greencastle, 1837 (Meth. Episc.); Hanover College, Hanover, 1832 (Presb.); Hartsville College, Hartsville, 1851 (United Breth.); Butler Univ., Irvington, 1850 (Christian); Union Christian College, Merom, 1859 (Christian); Moore's Hill College, Moore's Hill, 1854 (Meth. Episc.); Univ. of Notre Dame, Notre Dame, 1844 (Rom. Cath.); Earlham College, Richmond, 1859 (Friends); Ridgeville College, Ridgeville, 1867 (Bapt.); and St. Meinrad's College, St. Meinrad, 1857 (Rom. Cath.). There are also 2 institutions for the superior instruction of women, Westminster Seminary (Presb.), at Fort Wayne, and De Pauw College for Young Women (Meth. Episc.), at New Albany. The special educational and charitable institutions are the Soldiers' and Sailors' Orphans' Home, at Knightstown; State School for the Feeble-Minded at Richmond (temporarily); State Hospital for the Insane, State Institution for the Deaf and Dumb, and State Institution for the Blind at Indianapolis; House of Refuge at Plainfield; Reformatory Institution for Women and Girls at Indianapolis; N. State Prison at Michigan City; and S. State Prison at Jeffersonville. In 1887 the state appropriations included $2,029,410 from the school fund for tuition; $678,277 for benevolent institutions; $89,991 for reformatory; and $196,886 for penal.

Illiteracy.—Persons 10 years old and upward enumerated (1880), 1,468,095, unable to read 70,008, unable to write 110,761, whites unable to write 100,398; foreign-born whites enumerated 141,796, unable to write 12,612; whites 10–14 years old enumerated 238,068, unable to write 13,241, males 7,518, females 5,723; whites 15–20 years old enumerated 259,124, unable to write 10,081, males 5,650, females 4,431; whites 21 years old and upward enumerated 941,763, unable to write 77,076, males 33,757, females 43,319; colored persons 10 years old and upward enumerated 29,140, unable to write 10,363; colored 10–14 years old enumerated 4,469, unable to write 699, males 352, females 347; colored 15–20 years old enumerated 4,837, unable to write 858, males 411, females 447; colored 21 years old and upward enumerated 19,834, unable to write 8,806, males 4,345, females 4,461.

Finances and Banking.—The funded state debt 1888, Nov. 1, was $6,770,608; amount raised by taxation 1887 $1,270,000; taxable property assessed, real $566,521,981, personal $227,004,098. Of the total debt $3,904,782 is in school-fund bonds held by the state, $340,000 is held by Purdue Univ., $144,000 by the state treas. for the State

Univ., and $2,381,825 by New York banks. In 1889 there were 96 national banks (cap. $12,186,500), 44 state banks (cap. $2,253,000 of those reporting cap.), and 147 private banks.

History.—In its earliest history, I. greatly resembles Ill. (q.v.) The terr. now included within its limits was owned and occupied by the Miami Confederacy of Indians. From the discoveries of Marquette 1673 and La Salle 1680–2, the French claimed possession till 1765, when the region passed to the British crown through the Treaty of Paris. In this interval a number of Canadian French colonies were established at Vincennes, Corydon, and elsewhere, trading ports were opened, and alliances of friendship made with the Indians. Under the British I. was formally made a part of the province of Va., and this relation existed officially till 1784, when by the treaty of peace between the United States and Great Britain, 1783, and the deed of cession executed by Va., 1784, it became a possession of the United States, and 1787 was made a part of the vast tract known as the Northwest Territory, and comprising the present I., Ill., Wis., Mich., part of Minn., and, after the purchase of La from the French (1803), the unknown regions w. of the Miss. river. Its contribution to the history of the revolutionary war was the capture of the British post of Vincennes by the Americans under Gen. George Rogers Clarke, 1778, July 4. Two years afterward war broke out between the whites and the confederated Indian tribes, and was spiritedly waged in Vincennes and its vicinity till 1791, when Gens. Wilkinson and Wayne defeated them at the mouth of the Tippecanoe, and forced them into submission. After 4 years of peace the govt. secured a large tract of valuable land by the treaty of Greenville, and under liberal inducements a large immigration set in from the e. states. In 1800 O. was detached and erected into a separate terr., and all the region in the Northwest Terr. n. and w. of it was organized as the Terr. of I. In 1805 Mich. was set off as a separate terr.; 1809, Ill.; leaving I. Terr. as at present limited.

The first terr. gov. appointed was Gen. William Henry Harrison (q.v.), who had served through the Indian war and subsequently became pres., and the pop. of that part of the terr. now comprised within the limits of the state was 4,875. By 1810 the pop had increased to 24,520, and the terr. was prosperous. In the following year the Indians were excited to war by Tecumseh, the Shawnee chief, and his brother the Shawnee prophet. The Indians raided the settlements of the whites and carried off large quantities of their property. Gov. Harrison forbade traders selling whiskey to the Indians within a mile of Vincennes, or across the Wabash, in July; and as the Indian raids continued, he raised a body of regular and volunteer troops, marched to Prophetstown, demanded a surrender of the stolen property, was promised compliance the following day, and during the night (Nov. 6–7) was suddenly attacked by the Indians though an armistice had been granted. The troops, guarded against surprise, turned out promptly, and after a bloody struggle at Tippecanoe, forced the Indians to flight. Gen. Harrison lost 307 killed and had 151 wounded, and the Indians lost in killed 308. This battle destroyed the influence of Tecumseh and his brother over the Indians, broke up their confederacy, and brought a much needed though temporary relief from depredation to the frontier settlements. In the early part of the war with Great Britain (1812), the Indians renewed hostilities, but they were again subdued, and since 1815 I. has been wholly free from trouble from that source.

The first movement toward statehood was made immediately after the Tippecanoe campaign when a memorial was sent to congress; but the war with Great Britain and the appointment of Gov. Harrison to command the northwest army caused a postponement of action. In 1815, Dec., the petition to congress was renewed; 1816, Jan., a bill to admit the terr. as a state was reported; Apr. 19 it was passed; June 29 the first constitution was adopted; and Dec 11 I. was admitted into the Union. The new state grew rapidly in population and material wealth; more than 3,500,000 acres of govt. land within its limits were purchased in 10 years 1820–1830; enterprise and speculation ran side by side; and 1837 there resulted a general bankruptcy of people and state govt. The state debt was increased to $14,057,000, and it was not till 1846 that the state was able to resume interest payments. With this event, the completion of the Erie and Wabash canal, the extension of the railroad system, and the passage of the free banking law, I. started on a new era of prosperity. The state constitution was revised 1851, and an attempt to adopt a third one 1859 failed. During the civil war I. furnished 197,147 troops to the Union armies.

Government.—The executive authority is vested by the constitution in a gov., elected for 4 years, salary $5,000 per annum; the legislative in a general assembly comprising a senate of 50 members elected for 4 years, and a house of representatives of 100 members elected for 2 years, salary of each, $6 per day and 20c. mileage, biennial sessions in the odd years; and the judicial in supreme, circuit, and superior courts. Supreme court judges are elected for 6 years, circuit 6, and superior 4 The lieut.gov. receives a salary of $8 per day; sec. of state $2,000 per annum; treas. $3,000; auditor $1,500; attor.gen. $2,500; pension agent $4,000; 6 collectors of internal revenue $2,375–$4,500; surveyor of customs $1,000 and fees. There are 17 presidential and 76 other post-offices.

The successive govs. with their terms of service are as follows: *Terr.*—William H. Harrison 1800–11; John Gibson (act'g) 1811–13; Thomas Posey 1813–16. *State*—Jonathan Jennings 1816–22; William Hendricks 1822–25; James B. Ray 1825–31; Noah Noble 1831–37; David Wallace 1837–40; Samuel Bigger 1840–43; James Whitcomb 1843–48; Paris C. Dunning 1848–9; Joseph A. Wright 1849–57; Ashbel P. Willard 1857–61; Oliver P. Morton 1861–67; Conrad Baker 1867–73; Thomas A. Hendricks 1873–77; James D. Williams 1877–81; Albert G. Porter 1881–85; Isaac P. Gray 1885–89; Alvin P. Hovey 1889–93.

Counties, Cities, and Towns.—I. is divided into 92 counties. In 1880 Indianapolis had a pop. of 75,056; Evansville 29,280; Fort Wayne 26,880; Terre Haute 26,042; New Albany 16,423; Lafayette 14,860; South Bend 13,280; Richmond 12.742; Logansport 11,198; Jeffersonville 9.357; Madison 8,945; Vincennes 7,680; Michigan City 7,366; Elkhart 6,953; La Porte 6,195; Peru 5,280; Crawfordsville 5,251. In 1889 Indianapolis reported 125,000.

Politics.—State, congressional, and presidential elections are held on Tuesday after the first Monday in Nov. Bribers and fraudulent voters are excluded from voting. The state govt. (1889) is republican in state officers and democratic in legislature, with a party majority of 4 in the senate, 14 in the house, and 18 on joint ballot. I has 15 electoral votes. Her votes for pres. and vice.-pres. have been as follows: 1816, James Monroe and Daniel D. Tompkins 3; 1820, James Monroe and Daniel D. Tompkins; 1824, Andrew Jackson and John C. Calhoun 5; 1828, Andrew Jackson and John C. Calhoun; 1832, Andrew Jackson and Martin Van Buren 9; 1836, William H. Harrison and Francis Granger; 1840 William H. Harrison and John Tyler; 1844, James K. Polk and George M. Dallas 12; 1848, Lewis Cass and William O. Butler; 1852; Franklin Pierce and William R. King 13; 1856, James Buchanan and John C. Breckenridge; 1860. Abraham Lincoln and Hannibal Hamlin; 1864, Abraham Lincoln and Andrew Johnson; 1868, U. S. Grant and Schuyler Colfax; 1872, U. S Grant and Henry Wilson 15; 1876 Samuel J. Tilden and Thomas A. Hendricks; 1880, James A. Garfield and Chester A. Arthur; 1884, Grover Cleveland and Thomas A. Hendricks; 1888, Benjamin Harrison and Levi P. Morton.

Population.—(1800) white 5,343, free colored 163, slave 135, total 5,641; (1810) white 23,890, free colored 393, slave 237, total 24,520; (1820) white 145,758, free colored 1.230 slave 190, total 147,178; (1830) white 339,399, free colored 3,629, slave 3, total 343,031; (1840) white 678,698, free colored 7,165, slave 3, total 685,866; (1850) white 977.154, free colored 11,262, total 988.416; (1860) white 1,338,710, free colored 11,428, total 1,350,428; (1870) white 1,655,837, free colored 24,560, total 1.680,637; (1880) white 1,938,798, free colored 39,503, total 1,978,301.

INDIANAPOLIS, *ĭn-dĭ-ăn-ăp'o-lĭs:* city, cap. of Marion co. and of the state of Ind.; on White river at confluence of Fall creek, and of 15 lines of railroad; lat. 39° 55′ n., long. 86° 5′ w.; near the geographical centre of the state; 109 m. n.w. of Cincinnati, 195 m. s.s.e. of Chicago, 824 m. w. of New York; 14½ sq. m. It is on the line of the old national turnpike, in an unusually rich agricultural region, and its position and railroad facilities make it one of the most active distributing points in the country. It is laid out on a plain, with streets averaging 90 ft. in width, crossing each other at right angles, and bordered with notable forest trees, and 4 broad avenues running diagonally toward a circular park in the centre of the city, containing a statue of Gov. Oliver P. Morton and the site of a soldier's monument now (1889) nearly finished at a cost of $250,000.

The various railroads centre in a Union depot, and beside them is a belt railroad 12½ m. long, which extends entirely around the city. The public buildings include a capitol, built of Bedford limestone, with two wings and a dome, and Corinthian columns above the basement, and completed 1888 within the appropriation of $2,000,000; a county-court house which cost $1,600,000; city hall containing the principal markets and a hall with seating capacity of 4,000; U. S. court-house and post-office, of iron and stone, which cost $200,000; 4 U. S. arsenal buildings in an inclosure of 76 acres just outside the city; Y. M. C. A. building which cost $75,000, 5 free public libraries; the Exposition building, n. of the city, belonging to the state agricultural society, and erected of brick in the state fair-grounds at a cost of $150,000; Board of Trade building, cost $75,000, Odd Fellows' Hall, Masonic Hall, opera houses, and theatre. The charitable buildings comprise 3 hospitals, 2 free dispensaries, friendly inn, board of health, woman's exchange, home for the friendless, hospital for the insane which cost $1,200,000, school for deaf-mutes which cost $500,000, reformatory for women and girls, asylum for the blind, and 3 homes for orphans. Among the educational institutions are a university, law school, 4 medical colleges, dental college, Rom. Cath. theological seminary, 5 kindergartens, several commercial colleges, nearly 20 private and select schools, public high school, training school, 28 primary and grammar schools, and a state normal school. The public school property is valued at $1,061,411. There are more than 80 churches, divided denominationally as follows: Meth. Episc. 20; Presb. 13; Bapt. 8; Christian 6; Prot. Episc., Rom. Cath., and Lutheran, each 5; German 4; Congl. and Hebrew, each 2.

The belt railroad carries about 5,000 freight cars daily, belonging to the various roads centering in the Union depot. The stock yards cover over 100 acres, receive more than 1,000,000 hogs, cattle, and horses per annum, and with the belt railroad cost $1,500,000. There were (1889) 4 national banks (cap. $900,000), 1 state bank (cap. $200,000), 2 private banks, nearly 100 building and loan assocs. with aggregate cap. of several millions, a clearing house with annual transactions of $100,000,000, and more than 90 insurance companies (home and foreign) with aggregate cap. of $69,000,000. The agricultural industry has 4 grain elevators, and 8 flour and grist-mills, which handle an average of more than 21,000,000 bushels of grain per annum, and yield 500,000 barrels of flour; and the meat industry 3 pork and one beef-packing houses, the former packing more than 725,000 hogs per annum. The manufacturing establishments (1880) numbered 688, employed a capital of $10,049,500 and 10,000 hands, paid in wages $3,917,114, and yielded products valued at $27,453,089. In 1883 the establishments had increased to 772, capital $12,270,000, and products $30,700,000. In 1888 the wholesale trade amounted to $25,000,000 per annum; the city debt $1,400,000; tax rate $1.82 per $100; business property on Washington street was valued at $1,000 per ft.; dwelling property $100 per ft.; suburban dwelling property $500 per acre; and manufacturing sites along the belt railroad $250–$500 per acre. The city has a Holly system of waterworks, paid fire dept., with the electric alarm telegraph, 8 lines of street railroads, and is lighted by electricity and natural gas.

I. was first settled 1819, Mar.; superseded Corydon as cap. of the state officially 1821 and actually 1825; was named by the legislature and laid out as a town 1825; incorporated 1836, and chartered 1847. Pop. (1840) 2,692; (1850) 8,091; (1860) 18,611; (1870) 48,244; (1880) 75,056; (1889, est. by the mayor) 125,000.

IN'DIAN AR'CHIPELAGO: see **MALAY ARCHIPELAGO.**

IN'DIAN AR'CHITECTURE: of styles varying at different times in India, as in other countries, according to the religion prevalent at the time. The earliest religion of which we have any architectural monuments is that of Buddhism (q.v.). About B.C. 250, Asoka, a powerful monarch, became a strenuous supporter and propagator of Buddhism, and to his zeal are due the oldest architectural remains of India. The Buddhist remains are of two kinds: 1. Commemorative monuments, called Stupas or Topes (q.v.); the earliest stupas are single pillars, bearing evident traces of a western origin, and thus affording a clue to the history of Indian art. 2. Temples (chaityas) and monasteries (viharas). Of the chaityas and viharas, no built examples remain; they are all excavated out of the solid rock. There are no less than 40 or 50 groups of these monuments, each group comprising 10 to 100 distinct excavations. The great majority are Buddhist, and nearly the whole are monasteries, not over 20 to 30 being temples. The oldest are at Barhar and Cuttack in Bengal (B. C. 200), but they are few in number, nine-tenths of the caves being in the Bombay presidency (where there is softer stone). The latter date from the Christian era to about the 10th c. The cave-temple at Karli is one of the largest and finest: see BUDDHISM. In plan and general arrangements, it strongly, though no doubt accidentally, resembles a Christian basilica, with nave, aisles, and vaulted roof; and an apse with the shrine in the place of the altar. There is also an outer hall or atrium, and a gallery like the rood-loft. On the roof, are numerous wooden ribs, attached to the vault; these and other portions indicate that the building from which the cave was copied was wooden. This cave is 126 ft. long, 45 ft. 7 inches wide, and 40 to 45 ft. high.

The Vihara (q.v.) or monastery caves are numerous, as was required by the enormous number of Buddhist priests. The oldest and simplest examples are in Bengal, but the finest are in w. India. They consist of a central hall, with cells round three sides, and a verandah on the fourth side, next the open air; opposite the central entrance, there is usually a large cell or shrine, containing an image of Buddha. There are fine caves at Ajunta, Baugh, etc., many of them beautifully carved and painted. The pillars are most elaborately ornamented, and have the bracket capitals which distinguish all Indian architecture From the absence of any built example, there has been great difficulty in forming a correct idea of the exterior of the buildings from which these caves were copied. By following the style into other countries where the religion has prevailed at different times, Fergusson has been able to trace it up to the present day, and to establish by analogy the probable external appearance of the early Buddhist architecture.

The temple of Brambanam, in Java, seems to show the original form of built cells. They are quite detached, and arranged in a square round a central temple—evidently suggesting the arrangement in the caves at Ajunta. Some rock-cut temples which have an exterior (at Mahavellipore), show the cells attached to the main building. In Burmah, where the monastic system still prevails, the monasteries, which are of wood are built in stages in a pyramidal form. The temple of Boro Buddor (q. v.,) in Java, has a similar arrangement, consisting of a large number of cells or niches in tiers; but in place of being occupied by priests, they are filled with cross-legged Buddhas, a conversion quite common in later Hindu architecture. In many styles of architecture, the niches or other subordinate parts are frequently copies on a small scale of the façade of the building itself. Thus, for instance, the windows with pillars and pediments in classic architecture, are a repetition of a temple end The niches inside the caves, containing statutes of Buddhist saints, are in a similar manner imitations of the main façade. In the same way externally, the Burmese pagodas and Hindu temples are ornamented all over with models of the buildings themselves. Buddhist architecture, whatever its artistic qualities may be, has at least the interesting feature of being a style which has existed from B.C. 200 to the present day.

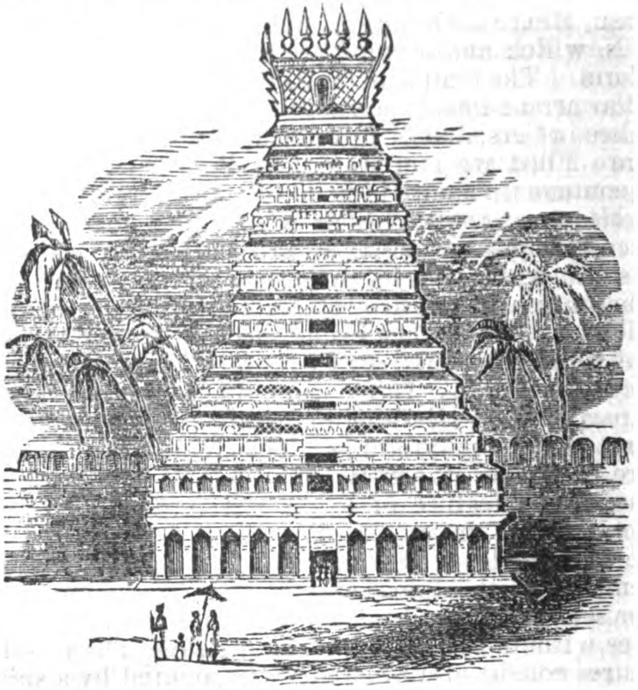
The other styles of Indian architecture are illustrated by the temples of the Jainas and those of the Hindus. The former seems to have been an imitation of the Buddhist temples without the cells for the priests. Their religious structures consist of a sanctuary surmounted by a spire; in front of this, a pillared vestibule, with a dome, and round the whole an arcaded inclosure, with cells all round, containing images. The cells also are surmounted with spires, and the arcades with domes are often repeated to a considerable number within one inclosure. The most striking feature of this style is the dome, constructed by horizontal jointing, not with regular arches. The domes, with the pillars, bracket capitals, etc., all are elaborately decorated.

Hindu architecture is divided into two styles—northern and southern. All the finest examples are southern, and are found s. of Madras. The temples consist of the temple or vimana, in front of which is the pillared porch or mantopa, the gate pyramids or gopuras, forming the entrances to the inclosure, and the pillared halls or choultries. In the south, the temple is always pyramidal, and in many stories; in the north, the outline is curved, and in one story.

The finest example is the pagoda of Tanjore. It is 82 ft. square at base, and 14 stories, about 200 ft. in height.

The gopuras are similar to the pagodas, but oblong in place of square.

The pillared halls are very wonderful structures, containing sometimes as many as 1,000 columns, and as these are all elaborately carved, and all different, the labor of their construction must have been enormous. The halls are used for many purposes connected with Hinduism, their most important use being as nuptial halls, in which the mystic union of the divinities is celebrated. The general arrangement of these halls sometimes produces a good effect; but from their flat roofs, they cannot equal the beauty of the domed arcades of the Jains. These buildings are of various dates, from the Christian era to the 18th c.; and it is remarkable that the oldest examples are the finest—the style growing gradually more and more debased, till at the present day, it has become, like the religion, a mass of absurdity and obscenity. The celebrated rock-cut temple, called the Kylas, at Ellora (q.v.), belongs to this style.


Gopura, or Gate:
Leading into the inclosure of the temple at Seringham.

When the Mohammedans conquered India, they imitated the style of the country in their mosques, and afterward the Hindus borrowed from them, and thus a mixed style was created, which in the palaces, tombs, etc., of the native princes, produces picturesque effects. The Mohammedans also covered the country with specimens of their Moorish style: see SARACENIC ARCHITECTURE.

Some of the finest building of India are the ghauts or landing-places, at the rivers, with their broad flights of steps; the reservoirs or bowlees, and dams, all ornamented with temples, kiosks, stairs, etc. There is one remarkable fact connected with Indian architecture, viz., that though the form of the arch is constantly used—in domes, arcades, etc., especially in the style borrowed from the Moslems—yet the arch with radiating joints is never adopted. The architraves are supported on bracketed capitals, which project, bracket over bracket, till the space is spanned by one lintel. This leads to many beautiful results in the early styles, and in the later mixed style, the bracketed cornices are among its finest features.

INDIAN CORN, or MAIZE, holds the leading place among the grains produced in the United States. It is a native of America and probably originated on the high table-lands of the sub-tropical portions of the continent. The first European visitors found it under cultivation in the W. Indies, Mexico, and Peru, and the colonists of Virginia and New England found it the principal crop grown by the Indians of those regions. It is now extensively grown in s. Europe, and in considerable quantities is produced in portions of Asia and n. Africa. It thrives over a wide range of climate and in a great variety of soils. A high temperature is required for its full development, but small varieties are grown as high as 47° north latitude. Excessive moisture, lack of sunlight and of intense heat during the summer, prevent its success as a field crop in England.

The stalks of corn are cylindrical in form, covered with a silicious substance, and filled with a fibrous pith. The leaves are long and flat, the largest ones being near the centre of the plant. The flower is in two portions, the staminate at the top of the stalk, in the form of a tassel, which bears large quantities of pollen, and the pistilate on the side of the stalk between the tassel and the ground, which is called the silk. The latter consists of threads which proceed from the ova. The latter is arranged in straight rows upon the cob which is closely covered with a number of leaves called husks, and from which the outer ends of the silk protrude. While there is but one species of corn, there are an immense number of varieties with more or less strongly marked characteristics. Owing to the peculiar formation of the flower, a variety can be kept pure only by being completely isolated from all other sorts. The pollen is carried long distances by the wind, and if it falls upon the silk of another kind it causes a mixture of the varieties. When a white variety is grown near a yellow sort, both white and yellow kernels will be found on a large proportion of the ears produced on each of the fields. To insure perfect purity, the variety to be maintained should not be grown within one-third of a mile of any other sort.

The different varieties of corn vary greatly in size, yield, and time of ripening. These qualities are modified by climate and soil, and are due largely to the environment of the plant. Some of the dwarf sorts, which have become adapted to a short season and a poor soil, grow only about three ft. high, produce very short and small ears, and ripen in 85 or 90 days. Other varieties adapted to hot regions with a long summer and a rich soil, reach a height of 18 ft. have ears 15 inches in length and three inches in diameter, and required about 150 days in which to mature. The plant has, in a remarkable degree, the power of adapting itself to its surroundings. Taken to a warmer climate and a richer soil than that in which it has been grown, it quickly increases in size, and requires a longer time in which to ripen. A variety which in Canada will ripen in 90 days from the time of planting will need three or four weeks more in which to come to perfection after being grown for a few seasons in the latitude of Philadelphia. The plant is as successful in a great diversity of soils as in a wide range of climate. Succeeding best in a rich, warm loam, it will yet grow in any land, from gravel to peat, which is not barren and is not extremely wet. The yield will be determined by soil, climate, variety, and cultivation. The average yield per acre in the United States in 1887 was 20·1 bushels, and ranged from 10 bushels in S. Carolina to 35·5 bushels in Vermont. In small plots in Tennessee and Kentucky it is is claimed that corn has been grown at the rate of 200 bushels per acre. The average yield in the great corn growing states is not far from 25 bushels per acre. It takes from the soil a smaller quantity of ammonia and a larger quantity of phosphoric acid and potash than an average crop of wheat. A large proportion of the potash appears in the stalk and cob. A special fertilizer for the corn-plant which is designed to add 50 bushels to the natural product of an acre of land, contains 64 lbs. of nitrogen, 77 lbs. of potash, and 31 lbs. of soluble phosphoric acid.

Maize. or Indian Corn.
(*Zea mays*).

Planting is done as soon as the ground is warm and dry in the spring. In the northern and central states, where principally this crop is produced, this is from about May 10 to June 1. The seed is planted in hills or drills. The latter method gives the largest yield, but increases the cost of cultivation. The rows are three to seven feet apart, according to location and variety. Hills are from two and a half ft. apart for the dwarf kinds, to four or five ft. for the subtropical sorts. From two to five stalks are grown in a hill. In drill culture the stalks are about ten inches apart in the row. If a large crop is to be grown the land should be liberally manured. If on stubble land the manure may be plowed in. If sod land is chosen, the manure should be spread after the plowing is done, and be thoroughly worked into the soil. Commercial fertilizers should be lightly covered with a harrow. A liberal use of manures or fertilizers will promote rapid growth and largely increase the yield of both stalks and grain.

The variety to be grown should be selected with reference to the character of the land and the length of the season. The large and late-ripening sorts should only be planted on rich soils and where the summers are both long and hot. Some of the small and early ripening varieties can be grown on land of very moderate fertility and where frost comes about Sep. 1. The small kinds will bear much closer planting than the large ones, but crowding is always injurious. There must be no more plants than the soil can feed, and they must not stand so closely as to prevent access of sunlight and free circulation of air. The increased weight of the stalks secured by close planting is more than offset by an increased number of barren plants and a diminished size of the ears.

When the crop is grown on a large scale, planting is done with a machine, drawn by one or two horses, which does the work rapidly and well. Where the hill system is adopted, it is very desirable to plant in squares, so that the rows will be straight across the field as well as lengthwise of it, and thus allow the cultivator to be run between the hills as freely as between the rows. By this means the weeds can be kept down with little or no hand-hoeing, and the yield of the crop will be increased by thorough pulverization of the soil. Land devoted to this crop should be plowed six or eight inches deep; but cultivation, though frequent and thorough, should be comparatively shallow. In most circumstances level culture is far better than the older method of making large hills. As soon as the plants can be seen, a light smoothing harrow should be run over the field. This will destroy numberless weeds and promote the growth of the corn, This should be soon followed with the cultivator which is to be used every week or ten days until the tassels appear. Weeds should never be allowed in the corn-field, but cultivation is to be carried on in clean fields for the benefit of the crop.

As the plant approaches maturity the leaves and stalks change from a dark green color to a lighter shade. If the stalks are to be saved for fodder, the corn should be cut as soon as the kernels are fairly glazed. The plants are cut near the ground, tied in bundles of convenient size, and set up in stacks of eight or ten bundles each. When fairly dried, which will be in three to five weeks, they are drawn to the barn and husked. The ears are put in well ventilated cribs, and the stalks packed in mows or stacks. Another method, now largely discarded, was to cut the stalks just above the grain, tie them in bundles and cure for fodder, leaving the corn to ripen in the field: then late in the season the ears were gathered, taken to the barn, and husked. In large portions of the West only the ears are harvested. The stalks are left standing until dry, and are then burned. When husking, the finest ears should be selected for seed. Enough of the husks should be left upon them to admit of their being tied in strings or traces.

They should be hung in a cool, dry place and kept until the following spring. If left upon the cob, the corn retains its vitality two or three years; but seed of the previous season's growth is preferred. By careful selection of seed through a long period, a great improvement in the quality and yield of grain can be secured, and the time required for ripening can be materially shortened. When grown expressly for fodder, corn is planted in drills about three and a half ft. apart and much more thickly than when grain is desired. About a bushel of seed is used per acre. Frequent cultivation is beneficial. As soon as large enough the stalks can be fed green to supplement the pastures. If the stalks are to be dried for winter use, they should stand until the ears are formed, but be cut before they are ripe. They should be set in small stacks and well cured before being stored. The yield per acre on good land is from three to four tons of dry fodder. This is double the quantity secured when the grain is allowed to ripen, and also the quality is superior. Corn is largely and profitably grown also for ensilage (see ENSILAGE). For fodder many growers prefer sweet corn to the ordinary field varieties.

The principal disease to which corn is subject is the smut. This is a parasitic growth, appearing on various portions of the plant, which in wet summers frequently occasions considerable loss. It is propagated by spores and absorbs its nourishment from the plant. Affected grains and stalks should be collected and burned. Seed should not be taken from fields in which this disease prevails, and some other crop should follow corn on land where it has appeared. Insects and birds often injure the crop by destroying the seed or plants, or preying on the ripened grain. Fall plowing, by which they are exposed to the action of the frost, will destroy many insects, and a rotation of crops will tend to prevent their multiplication in any given field. Birds can often be kept away by twine strung on poles around the field, or bright pieces of tin hung so they will reflect the light.

Corn is one of the most important of food products. In a green state it is extensively used in summer and canned for winter, and the ripened grain is ground and used in various forms. For feeding to animals, either for work or fattening, it is the cheapest and most extensively employed of all the grains. Great quantities are used also in the manufacture of starch. The juice of the stalks is very sweet and can be converted into syrup of fair quality. In experiments conducted by the government 1880 and 1881 sugar was made at the rate of 900 lbs. per acre from stalks which had matured a large crop of grain. The leading corn-producing states at present are Iowa, Illinois, Missouri, Kansas, Nebraska, and Indiana.

IN'DIAN CRESS: see TROPÆOLUM.

INDIAN CUCUMBER: single-species, perennial herb; nat. order *Liliaceæ*, tribe *Trillideæ*, known also as ***Medeola Virginica*** and ***Gyromia***; idigenous chiefly to the rich moist woodlands of the central Atlantic (U. S.) states. It received its popular name from the cucumber-like shape and taste of its tuberous white root, which is said to have been eaten by the Indians; and its scientific from the sorceress Medea, because of a former belief that its root possessed valuable medicinal properties. It has a slender stem, 1–3 ft. high, near the middle of which is a cluster of 5-9 thin leaves, and at the top a cluster of 3 smaller leaves and 3–6 three petal flowers, which bloom in May and June.

IN'DIAN GRASS MAT'TING, or In'dian Mat'ting; kind of matting imported in large quantities from Calcutta, made from a species of Papyrus (q.v.) *P. Pangorei*, called *Madoorkati* in Bengal, and there very abundant. The stalks of the plant, when green, are split into three or four pieces, which, in drying, contract so that the edges come almost into contact; and when woven into matting, they show nearly the same beautiful shining surface on both sides.

IN'DIAN O'CEAN: one of the five grand divisions of the universal ocean; bounded s. by a line drawn from the Cape of Good Hope to the most southerly extremity of Tasmania or Van Diemen's Land. Its other limits reckoning from the last-mentioned point, are Van Diemen's Land, Australia, the Indian Archipelago, Farther India, Hindustan, Persia, Arabia, and Africa. Gradually narrowing from s. to n., the I. O. forks at Cape Comorin into the Bay of Bengal on the e., and the Arabian Sea on the w., the latter again branching off into two arms, the Persian Gulf and the Red Sea, which reach respectively the mouth of the Euphrates and the neighborhood of the Mediterranean. These details exclude the waters of the Indian Archipelago, as belonging rather to the Pacific Ocean. As above defined, the I. O. stretches in n. lat. 43° 35′ s. to 30°, and in e. long. 18° 29′ to 146° 12′. It contains thousands of islands, or rather tens of thousands. Of these, Madagascar is the largest, and at about the same distance from it to the e. as the continent of Africa is to the w., lie Bourbon or Reunion toward the s., and Mauritius toward the north. Next in size to Madagascar, and in fact, the only other island of any considerable magnitude, is Ceylon. As a channel of commerce, this ocean appears to have been the first to find a place in history, inasmuch as the earliest voyage on record beyond the land-locked Mediterranean—that of Solomon's navy—did certainly extend further than the Straits of Bab-el-Mandeb. In this respect, it virtually maintained its superiority fully 2,000 years, being habitually traversed, in the line of the crow's flight, between Arabia and Hindustan, while coasting voyages alone were known in the Atlantic. This comparatively bold navigation was suggested and facilitated by the periodical monsoons of the n. part of the I. O., blowing, as they do, alternately from the s.w. and the north-east.

INDIAN POKE: see Hellebore.

INDIANS, AMERICAN: aborigines of the western continent; all the tribes which inhabited the new world when it first became known to Europe, and their descendants since that date. The name originated in a geographical misconception that this new world was but the projection or extension of India or the e. of Asia, and that consequently the natives were geographically connected with the people of the E. Indies. The islands between N. and S. America were, accordingly, the 'W. Indies.' The w. hemisphere has not been fortunate in the naming either of the country itself, or its aborigines.

The origin of the American race or races is still an unsettled question. The theory which hitherto, perhaps, has found most acceptance derives them from Asia, ferrying them across Behring Strait. In the Swedish Polar expedition (1878–79), Prof. Nordenskjöld traced in the Tchuktchis, on the n.e. coast of Siberia, an 'unmistakable stamp of the Mongols of Asia, and the Eskimo and Indians of America.' Lieut. Palander of the same expedition, however, assimilates those Tchuktchis to the Greenland Eskimo, while Peschel groups them with the native tribes of Kamtchatka. The Samoyedes and other Arctic races of Asia, it is further pointed out, are of Mongoloid stock, and distinctly round-headed; while the Eskimo, next to the Kai Colos of Fiji, are the longest-headed race on the globe.

The derivation of the American races in whole or in part from Chinese, Japanese, or other Asiatic arrivals on the w. sea-board, is attended with at least equal difficulties; for where are any affinities between such emigrants and the American races in language, customs, arts, modes of life? The latter, at the time of their discovery, had neither rice, wheat, barley, oats, or rye; nor iron; nor horse, sheep, camel, or poultry; all which, since then, propagate and flourish in the new world. The natives were found cultivating only maize, squashes, plantains, cassava, potato, tobacco. They had one poor beast of burden, the llama, confined to the uplands of s. Cordilleras, and one species of dog unrepresented in the old world. Their knowledge of metals was limited to copper, bronze, lead, gold, and silver. The language of the red men, furthermore, is generally different from all Asiatic languages; from the Indo-Chinese monosyllabic character, from the agglutinating Ural-Altaic, from the inflexional Semitic and Aryan; it, is in fact, a product pure and wholly of America, without any old world affinities or analogies whatsover; describable as polysynthetic or hugely agglomerative, expressing a whole sentence sometimes in a seventeen-syllabled word. This character applies to all their 760 inextricably intermixed languages. Then their physical, and for the most part their mental traits also are, as an *ensemble*, all their own. Their hair is universally black, straight, glossy, and long, never wavy, persistent to old age, properties characterizing also the hair of the mummies of the Ancon necropolis, and other places of Peru; the beard very scanty, generally wholly, sometimes only partially, rooted out; the eyes small deep-set, always horizontal, soft, partially closed and languid when not roused by passion, and overset by narrow and high-arched eyebrows; the brow itself, broad and low, receding in a remarkable degree toward the flat crown; the cheek-bones broad and prominent; the nose also prominent and sensitive, often very long and aquiline; the hands delicate and long-fingered, soft and smooth like the silken skin of the whole body; the whole figure supple, elastic, shapely, and agile. The features are generally regular, often handsome. The Crows, in particular, six ft. high, with exceedingly long hair reaching to the ground, and in some cases measuring 10 ft. (all of a piece), are described as decidedly handsome, or even noble. The women, with their soft luscious figures, dark soft eyes, delicate hands, and altogether feminine characteristics, are said to be not without sensuous attractions. In complexion they are mostly of a copper, cinnamon-brown, or olive-yellow hue, though there are also many varieties, merging on one side into the deep, almost negro tint of the Guaicuri and Pericui of Lower California, and the Charruas of Uruguay: and on the other side into the almost brilliant blonde of the Mandans and Hydas (Queen Charlotte islanders). The body lithe, swift, and supple, is yet not so strong generally as that of the European or Negro type, nor capable of so much hardship, fatigue, or enduring strain. In stature, the races range from the dwarfish Eskimo and the Peruvian, with a mean height of 4 ft. 9 inches, to the Crow of 6 ft. height, and the gigantic Patagonian. Psychically, the N. American, in his native state, is peculiarly haughty, serious, habitually taciturn and grave, yet on occasion eloquent and naïvely imaginative; full of simple child-like wonderment and trustfulness till suspicion has been aroused; with plenty of slumbering passion, which excited becomes over-mastering; in warfare stealthy, soft-paced, cunning, treacherous, with unslakable fury of revenge when the enemy is in his clutch; yet remarkably cold and stoical in outward manner, suffering with proud nonchalance the utmost extremity of fate. Altogether, he is somewhat of a sad, soft, serious, passionate, pathetic personage.

All signs, then, seem to favor the theory that the native Americans are as indigenous to the country as are its peculiar fauna and flora; or at all events, if they did originally issue from Asia, it must have been in a most remote, prehistoric time.

When the country was discovered, the most civilized parts were those extending from New Mexico to Peru, the best specimens of architecture being found in the Maya region and in Peru. The Pueblo Indians of New Mexico had towns surrounded by high walls scaled by ladders. There was also in Mexico a system of picture-writing, and there they boasted of records to a remote date. The Peruvians used quipos or knotted cords as aids to memory. In this quarter was also a more or less constituted government by kings and hereditary chiefs. Outside this region, the only monuments are mounds, principally in the Ohio valley, of peculiar shape, apparently symbolical. In all America beside, the native races, in numberless, widely scattered, small-clustered tribes and clans, roamed their primeval forests of oak and pine, of cotton-wood and pecan, and the immeasurable prairies; subsisting chiefly by the chase, hunting the droves of buffaloes, the elk, the antelope, trapping beavers, etc. They had attained marvellous swiftness and precision of movement. From his horse at full gallop the Indian can shoot 15 or 20 arrows a minute at flying buffaloes, all with sure aim and deadly effect. The Gauchos and other mixed races of S. America, at the present day challenge the world in horsemanship. They will swing themselves under the belly of the horse, hang on there with toe and heel, while the horse is in full chase, then bound aloft on its back again at pleasure. The Indians almost all are hunters armed with bow and arrow, with spear and dart; in S. America, with lassoes and stoneballs attached to hide-ropes. In their wild state, they live in wigwams, of bark among the Iroquois, but generally of hides among the other tribes. They, especially the Crows, are skilled in dressing skins. Their own clothing consists of a robe and leg-covering for the men, and a short petticoat for the women, though in some warm places the clothing is very scanty. Some of the tribes dress richly and picturesquely. A chief is arrayed in a shirt or tunic made of two deer-skins, and embroidered with porcupine quills and the hair of scalps. Over this is a robe of the skin of the young buffalo-bull, with the hair remaining on, the inner or flesh side garnished with porcupine quills, and a rude portrayal of the battles or events of the wearer's life. The legs are encased in deer-skins, also ornamented, and the feet shod in moccasins of buckskin. All the tribes are fond of painting and tattooing their bodies, the figures being varied for grief or joy, for war or peace. The use of tobacco is almost universal, and a chief boasts a pipe four or five ft. long and two inches wide, wound with braid of porcupine quills, the bowl ingeniously carved by the chief himself. The calumet is the symbol of peace, and solemnizes all treaties and all great councils. The Indians believe in the Great or Good Spirit, but also in evil spirits particularly needing to be propitiated. The dead are solemnly buried with a supply of food and implements for the next world. One of the great features of Indian life is 'medicine' (the word adopted from the French) or mystery. The 'medicine man' is physician, magician, prophet, soothsayer, juggler, and high-priest. Every respectable Indian has a 'medicine bag,' made of the skin of an animal, bird, or reptile, and elaborately ornamented, stuffed with grass or moss, and religiously closed or sealed. This bag is in the highest degree sacred; days, and even a week, of fasting, and sacrifices of dogs and horses, being devoted to it. At 14 to 15 years of age a boy is 'forming his medicine'—that is, he wanders from his father's house, absenting himself for two, three, sometimes even five days, during which time he lies on the ground crying to the Great Spirit, and fasting all the time. After he has fallen asleep from weariness, the animal that he dreams of is his 'manitou,' the protector assigned him by the Great Spirit for life. Having returned home and satiated his appetite, he sallies out with weapons to procure the animal or bird dreamt of, which he then preserves entire about him through life for 'good luck.' In death it is buried with him. To lose it in war or otherwise is to lose one's honor, retrievable only by conquest of the medicine-bag of a tribal enemy. All the Indian religions of N. America seem to have arisen out of ancestor worship (see TOTEM). In the science of medicine proper, the Indians have some empirical knowledge, having particular herbs and appliances for asthma, coughs, diarrhea, diseases of the skin, etc.

Before acquaintance with Europeans, the Indian beverage was almost exclusively water. In Mexico, however, pulque (q.v.), the fermented sap of the agave, was drunk; and in S. America a beverage made from fermented cashew and other fruits.

The trained hauteur and stoicism of the Indians is remarkable. One day, during King Philip's war in New England, a chief ran unaware into the hands of the English. A young official 22 years of age questioning him, the chief refused conversation with him: 'You much child, no understand matters of war.' When sentenced to death, 'he liked it well, he would die before his heart was soft, or had spoken anything unworthy of himself.' Hatuay, a powerful chief of Hispaniola, urged by the Spaniards to embrace Christianity before he was burned, and thus go to heaven, refused to 'go where he would meet any of the accursed Spanish race.' In a reunion of the most intimate relations and friends, the Indians maintain the coldest reserve, and yet at death the lamentation of the survivors is extreme. In the Far West, and among the Rocky Mountains, where the Indians are yet intact from the whites, they are said by some visitors to live simply and hospitably. George Catlin, who lived eight years exclusively among different tribes of N. America—himself evidently of an artless, childlike, sylvan nature—looks upon the Indians 'as the most honest and honorable race of people I ever lived among in my life.' During all those eight years he everywhere met cordial hospitality and the kindest offices at their hands, while he 'never lost the value of a shilling among them.'

'Civilization,' however, as an external contact merely, has proved the ruin of the Indians morally and physically. Thirst for revenge, unquenchable hate, loss of self-respect, and whisky, have been the constant heritage (especially in the United States) entailed on the reds by the approach of the whites. The result of the English settlements, and the policy of the United States, have all along been to thrust the Indians ever farther into the west, till now there are no wild tribes e. of the Mississippi. The Cherokees and Creeks were bodily removed from Georgia to the Indian Territory 1838. Virginia had three Indian wars or massacres, 1622, 1629, 1637; New England two—the Pequot war, 1637, and King Philip's war, 1675. The United

States policy with the Indians has not been satisfactory or successful, and difficulties and small wars have been frequent. Christian missons have been largely prosecuted among them by individuals and societies. The French and the Spaniards had missions; and of Prot. missionaries the names of Mayhew, John Eliot, and the Brainerds are conspicuous. The five civilized tribes of the Indian Territory (q.v.) raised (1880) over 3,000,000 bushels of grain, and had 100 schools, and 8,500 pupils—industries being taught there and on the other reservations. Nevertheless, as rule, the Indians recognize their inevitable doom, and all spirit dies out of them. 'They are migrating to their fathers and the setting sun.' In Canada, in the spring of 1885, the half-breeds and Indians of the N.W. Territory rebelled under Louis Riel, who, after their defeat by General Middleton, was hanged. Three towns of Canada are exclusively Indian. The great mass of Spanish Americans are of Indian origin. In Canada there were in 1881 nearly 104,000. In N. America altogether, the Indians were calculated at considerably less than four millions; and in S. America, including pure and mixed, about seven millions.

In the United States and territories, excluding Alaska, there were reported (1880) 256,127 Indians, and the Indian pop. of Alaska, full-bloods and half-breeds, was estimated at 30,000. Of the 256,127, 138,046 wore citizens' dress, and were classed as civilized and semi-civilized. The Five Nations in the Indian Terr. numbered: Cherokees, 20,000; Choctaws, 16,500; Creeks, 14,500; Chickasaws, 7,000; and Seminoles, 2,500; total 60,500. These were regarded as the most civilized in the country; had 13,177 children of school age; occupied 16,250 houses; had 33,650 wearing citizens' dress; and maintained from tribal funds and govt. appropriations 12 boarding and 183 day schools, which accommodated 6,250 pupils. Of the other and less advanced Indians, 77,546 wore citizens' dress and 11,081 could read, and they occupied 11,634 houses, and maintained 52 boarding and 107 day schools, which accommodated 9,431 pupils. The chief reservations contained: Mich., 10,000; Wis., 7,649; Minn., 6,157; Dak., 27,550: Mont., 19,791; Id., 4,165; Wash. Terr., 14,468; Or., 5,826; Ind. Terr., 60,500; total, 156,106. In the British Terr. the Crees, Blackfeet, Ojibways or Chippewas, and Assiniboines were estimated at 35,000, which would make a total of 70,000 Indians living near the boundary line.

The total of civilized Indians in the United States and territories was computed at 66,407, distributed as follows: Ala., 213; Ariz., 3,493; Ark., 195; Cal., 16,277; Colo., 154; Conn., 255; Dak., 1,391; Del., 5; D. C., 5; Fla., 180; Ga., 124; Id., 165; Ill., 140; Ind., 246; Ia., 466; Kan., 815; Ky., 50; La., 848; Me., 625; Md., 15; Mass., 369; Mich., 7,249; Minn., 2,300; Miss., 1,857; Mo., 113; Mont., 1,663; Neb., 235; Nev. 2,803; N. H., 63; N. J., 74; N. M., 9,772; N. Y., 819; N. C., 1,230; O., 130; Or., 1,694; Penn., 184; R. I., 77; S. C., 131; Tenn., 352; Tex., 992; Utah, 807; Vt., 11; Va., 85; Wash. Terr., 4,405; W. Va., 29;

Wis., 3,161; Wyo., 140. Indians in Ind. Terr. and Alaska, and all not taxed were excluded from the census. In 1886–7 the uncivilized Indians were estimated at 170,025, distributed as follows: Ariz., 19,902; Cal., 4,797; Colo., 1,728; Dak., 29,747; Id., 3,449; Ind. Terr., 14,898; Ia., 380; Kan., 1,007; Mich., 7,300; Minn., 6,028; Mont., 12,894; Neb., 3,694; Nev., 8,238; N. M. 27,489; N. C., 3,000; Or., 3,991; Utah, 2,308; Wash. Terr., 10,579; Wis., 6,796; Wyo., 1,800. These had 41,876 children (6–16 years), 5,810 govt. boarding and 3,400 day schools, and 2,020 mission boarding and 540 day schools, leaving 28,395 children for whom there were no school accommodations. There were 1,711 Indian children of school age on the N. Y. reservations, who were adequately supplied with school facilities. Besides the schools on the various reservations the govt. defrays the expense of educating Indian children at the Carlisle (Penn.) School, and the Hampton (Va.) Normal and Agricultural Institute (q.v.).

The sources from which the money for Indian education is obtained are three: congressional appropriations; treaty, interest, and other funds; and the treasuries of religious bodies which maintain Indian missions. This money was received and distributed among the uncivilized Indians (1886–7) as follows: receipts, from the U. S. govt. for general support $912,625; support of 770 students at various institutions $126,040; buildings, current appropriations $134,750; unexpended appropriations $19,804; transportation of pupils $28,000; purchase of live stock $10,000; treaty, interest, and other funds $163,700; total from govt. $1,394,919; expenditures: by U. S. govt. for boarding and day schools and pupils $1,095,380; buildings, sites, and repairs $76,080; live stock $8,500; transportation of pupils $24,000; total by govt. $1,203,960; by state of N. Y. $9,122; by American Missionary Assoc. for schools and church work $47,921; by the Soc. of Friends $21,729; grand total $1,282,732. The denominations doing the largest work among the Indians are the Presb., Rom. Cath., Prot. Episc., and the Congl. churches. (For the school system of the Five Nations, see INDIAN TERRITORY.)

In 1887–8 the Indian pop. of the United States and territories, excluding Ind. Terr. and Alaska, was reported at 243,249, of whom 11,085 were mixed bloods; 58,590 wore citizen's dress wholly and 32,507 partially; 19,816 were able to read; 25,255 could speak English sufficiently for ordinary intercourse; and 20,162 were church members. The total govt. appropriations for the Indians 1789, Mar. 4—1888, June 30, was $242,290,230. In recent years it was (1885) $6,552,495; (1886) $6,099,158; (1887) $6,194,523; (1888) $6,249,308. See DAKOTA: INDIAN TERR.: and the various Indian tribal names.

Bureau of Indian Affairs.—The control of all Indian affairs in the United States and territories is vested by law in a bureau of the Interior Department, with a commissioner and asst. commissioner in charge. The Board of Indian Commissioners consists of 10 persons, selected by the pres. for their eminence in business, educational, religious, or philanthropic work, who choose one of their number for sec., and, excepting the sec., receive no compensation. They supervise all expenditures of money for the Indians, inspect all goods purchased, and have access to all books and papers relating to the service, but are not required to perform clerical work. The pres. also appoints 5 Indian Inspectors, by whom each superintendency is visited twice a year, and their business management fully investigated. The inspectors are empowered to enforce all laws relating to the Indians, and to prevent the violation of any law; and also to suspend for cause any supt., agent, or other employee, and temporary fill the vacancy. They receive $3,000 per annum each. The pres. also appoints 4 or more supts. of Indian affairs, each having a general supervision and contol over the official conduct and accounts of all officers and persons employed by the govt. in Indian affairs within a specified jurisdiction; a supt. of Indian schools; and a large number of Indian agents, subagents, and traders.

Agency System.—Each Indian agent is appointed for 4 years, required to give a bond, manages and superintends the intercourse with the Indians in his particular jurisdiction according to law, and executes new laws and regulations that may be provided. He is required to reside and keep his agency within or near the tribe of Indians to which he is assigned, and may not leave his agency withou permission. The limits of each superintendency, agencyt and sub-agency are established by the sec. of the Interior Dept., either by tribes or by geographical boundaries. An interpreter (educated Indian preferred) is allowed each agency. Indian traders are appointed on giving bonds of at least $5,000 for the faithful observance of all laws regulating trade and intercourse with the Indians, and may open stores for trade among the tribes to which they are assigned.

The following is from A. H. Keane's General Scheme of American Races and Languages:

1. Sub-Arctic Races—Eskimos Aleuts, Thlinkeets.
2. Athabascan or Tinney family.
3. Algonquin family, from Canada to S. Carolina, and from the Atlantic to the Rocky Mountains. To the northern branch belonged or belong the Chippewas or Ojibways, Ottawas, and Crees; to the eastern, the Abenakis, Penobscots, Mohicans, or Mohegans; to the southern, Powhattans, Rappahannocks, Shawnees; and to the western, Illinois, Miamis, Cheyennes, and Blackfeet.
4. Wyandot-Iroquois family, from Upper Canada to W. Virginia, surrounded by Algonquins. To them belong Wyandots or Hurons, Iroquois or 'Six Nations' (including Mohawks, Oneidas, Onondagas, Senecas, Cayugas, Tuscaroras), and Monocans.
5. Dakota or Sioux family, including Assiniboines, Winnebagoes, Omahas, Iowas, Kansas, Crows.
6. Appalachian Races — Muscogee group, Cherokees, Catawbas, Natchez, etc.

7. Columbian Races.
8. Californian Races.
9. Shoshone and Pawnee families, from Idaho to New Mexico, including Utes, etc.
10. New Mexican and Arizona Races—Pueblos nations, etc.
11. Mexican Races—Aztec-Sonora group, Miztec, Zapotec, Zacatec, etc.
12. Central American Races.
13. Orinoco Races—Carib family, Barré family, etc.
14. Amazon Races.
15. Peruvian and Bolivian Races.
16. Brazilian Races—Guarani family, Botocudos, etc.
17. Patagono-Chilian Races—Araucanians, Puelches, Tehuelches, Fuegians.

IN'DIAN SHOT (*Canna Indica*): plant common in almost all tropical countries; a herbaceous perennial, with a creeping root-stock (*rhizome*), and a simple stem, formed by the cohering bases of the large, tough, ovate-oblong leaves. It belongs to the nat. ord. *Marantaceæ*. It derives the name I. S. from the seed, hard, round, and about the size of a very small pea, and which is sometimes used as shot. The seed yields a beautiful red color. The root-stocks are very large, spongy, and jointed, and are used in Brazil for emollient poultices in tumors and abscesses. The root-stocks of some of the other species of *Canna* are more valuable, yielding the starch called TOUS-LES-MOIS (q.v.).

IN'DIAN TER'RITORIES of British America: name formerly given to the vast region, now mostly known as the NORTHWEST TERRITORY of Canada (q.v.).

IN'DIAN TER'RITORY: unorganized terr. of the United States, set apart by the federal govt. as permanent reservations for peaceful Indians, to which was added by cession by Tex. a strip of 'public land,' 35 m. wide, between the 100th and 103d meridians, though it is not officially considered a part of it.

Location and Area.—Excluding the 'public land,' I. T. is in lat. 33° 35′—37° n., long. 94° 20′—100° w.; bounded on the n. by Colo. and Kan., e. by Mo and Ark., s. and w. by Tex.; extreme length e. to w. 310 m., extreme breadth 210 m.; 64,690 sq. m. (41,301,600 acres); chief town Tahlequah.

Topography.—In the extreme n.w. are the foot-hills of the Rocky Mountains, whence the surface gradually slopes e. and s.e., and is in general arid and treeless; in the centre are fertile bottom-lands; and in the e. are broad tracts of fine agricultural soil, with some stony places and few trees. The terr. is drained by the Red river, which forms the s. boundary, and receives its N. Fork and the Washita river; and the Ark. river, which receives the Cimarron where it crosses the boundary of the Osage and Creek nations, and the Canadian with its numerous forks at the boundary of the Cherokee and Choctaw nation. These rivers traverse the terr., e. to w., and between the Red and Canadian rivers are the Washita, Poteau, and Sans Bois Mountains.

Geology.—Azoic rock formations are found in the Cherokee and Creek nations, but the dominant strata are carboniferous, with some cretaceous and tertiary in the n.w. The carboniferous region is known to contain large semi-bituminous coal measures; but the Indians will not mine them, and the federal govt. cannot allow others to do so. The peculiar relations of the Indians to the govt. have prevented any attempt to determine the geological features of the tract.

Zoology.—A few fish are found in the rivers; birds in great variety abound in all parts; the buffalo is nearly exterminated; some wild horses are occasionally seen; but deer, black bear, prairie dog, prairie hen, wild turkey, and several kinds of grouse are numerous.

Climate.—The w. portion is warm, dry, and subject to drought, the e. has an adequate rainfall, and the central a mean annual temperature of 57°—59°. Cold n. winds are frequent in the w. In general the climate is healthful the year round.

Agriculture.—In 1880 there were 8 agencies in the terr.; Cheyenne and Arapaho, engaged in agricultural pursuits 527; Kiowa, Comanche, and Wichita, 750; Osage, 600; Pawnee, 200; Ponca, 50; Quapaw, 126; Sac and Fox, 1,029; and the Union, comprising the civilized Indians and officially known as the Five Nations—the Cherokee, Choctaw, Creek, Chickasaw, and Seminole tribes. The tribes included in the 8 agencies had 31,105,920 acres in their reservations, of which 10,246,405 were suitable for cultivation. The Five Nations had land as follows: Cherokee, 5,031,351 acres; Choctaw, 6,688,000; Creek, 3,215,495; Chickasaw, 4,650,935; Seminole, 200,000; total 19,785,781, Of the total they had 273,000 acres under cultivation; on which they raised 565,400 bushels of wheat, 2,015,000 of corn, 200,500 of oats and barley, 336,700 of vegetables, and 10,550 bales of cotton; cut 176,500 tons of hay; and had 45,500 horses, 5,500 mules, 272,000 cattle, 190,000 swine, and 32,400 sheep. Outside the Five Nations there were 16,931 acres under cultivation, on which 5,840 bushels of wheat, 90,774 of corn, and 10,441 of vegetables were raised, and 19,092 horses and 12,684 cattle maintained.

Manufactures.—Beyond agriculture and stock-raising the principal industries of the Indians are lumbering, shingle-making, blanket and shawl weaving, maple sugar boiling, wool clipping, bark peeling, and basket making.

Railroads.—Railroad building has been retarded by the opposition of the Indians, but within the last 10 years considerable progress has been made, and 1888 there were the Atchison Topeka and Santa Fé running straight through the centre of the terr.; the Mo. Kan. and Tex. traversing the Cherokee, Creek, Choctaw, and part of the Chickasaw Nations; a 50-m. stretch from Fort Smith, Ark. to Muscogee in the Creek Nation, passing through the Cherokee Nation, a branch of the Rock Island system crossing the terr.; a branch of the s. Kan. cutting the n.e. corner; and surveyed routes for the Atlantic and Pacific straight across the terr., and the Dennison and Washita Valley diagonally across it. In addition to these congress gave the right of way that year to 6 or 7 other roads.

Religion.—In 1887 there were about 200 churches in the terr., with 13,208 members, divided denominationally in the following order: Bapt., Meth., Episc., Presb. (S.), Presb. (Cumberland), and Presb. (in the U. S. of A.).

Education.—Education efforts are confined almost exclusively to the Five Nations. The Cherokees had (1886–7) 2 boarding schools, an orphan asylum with accommodations for 550 pupils, and 100 day schools with an aggregate capacity of 5,000. There are also 10 denominational schools, and 12 common schools are provided for negroes. The national schools cost $80,000 for the year, and had an average attendance of 2,600 and an aggregate of 4,200. The Choctaws had 4 boarding and 83 'neighborhood' schools, send 13 boys and 13 girls out of the terr. to be educated, have 300 pupils in the boarding and 3,512 in the 'neighborhood' schools, own school property worth $200,000, and spent $82,269 on their schools that year. The Creeks had 5 national, numerous denominational, and 28 public schools, spent $36,800 on their own schools, and were educating 21 pupils in the states at a cost of $6,500 per annum. The Chickasaws had 4 boarding and 14 common schools, with accommodations for 590 pupils, and the Seminoles 2 high (boarding), 4 district, and a number of denominational schools.

History.—I. T. was a part of the La. purchase from France 1803; was designated by the federal govt. as the permanent home of the Indian tribes e. of the Miss. river 1832, was settled by the Creeks, Choctaws, Chickasaws, and Cherokees 1833–8, and the Seminoles, Sacs and Foxes, Comanches, Modocs, Nez Perces, and other smaller tribes at various intervals since. During the civil war a large part of the Five Nations was engaged in the confederate service. In 1866 the Creeks ceded to the govt. the w. half of their entire domain, about 3,402,428 acres, and the Seminoles their entire domain of 2,037,414 acres. These ceded lands took the name of the 'Oklahoma country,' and 'boomers' immediately began organizing to take possession of them. U. S. troops were kept busy several years protecting the Indians surrounding the coveted tract, and expelling the armed and determined 'boomers' who occasionally crossed the prohibited lines, and sought to pre-empt homesteads. Under an act of congress and by proclamation of Pres. Harrison, 3,000,000 acres of the Oklahoma country were thrown open to settlement at noon 1889, Apr. 22. (See OKLAHOMA.)

Government.—Each of the Five Nations is governed by a principal chief, aided by a legislature; the other Indians by their tribunal forms; and all are supervised by the U.S. govt., through the Interior Dept., the Indian Bureau, and its various officers. (See INDIANS, AMERICAN, *Bureau of Indian Affairs.*) Excepting the Oklahoma country, there are no counties or townships in the I. T., each reservation being clearly defined and many changing their limits through decrease in tribe numbers and cessions to the federal govt.

Cities and Towns.—Excluding the 'boomer' cities, the principal places are Tahlequah, cap. of Cherokee Nation, Caddo, Choctaw; Fort Gibson, Cherokee; Muscogee, Creek; Tishomingo, Chickasaw; We-wo-ka, Seminole; and Armstrong Acad., and Okmulgee.

Tribes.	Sq. m.	Acres.	Pop.
Cherokee	7,861	5,031,351	20,336
Chickasaw,	7,267	4,650,935	6,000
Choctaw	10,450	6,688,000	16,000
Creek	5,024	3,215,495	15,000
Seminole,	312½	200,000	2,700
Cheyenne and Arapaho	6,715	4,297,771	6,569
Kaw	156½	100,137	285
Kiowa and Comanche	4,639	2,968,893	2,583
Modoc	6	4,040	97
Osage	2,297	1,470,059	1,950
Ottawa	23½	14,860	115
Pawnee	442	283,026	1,251
Peoria and Miami	78½	50,301	204
Ponca and Nez Percé	317	192,626	864
Quapaw	88½	6,685	48
Sac and Fox	750	479,667	90
Seneca	81	51,958	322
Shawnee	21	13,048	793
Wichita	1,162	743,610	214
Wyandotte	33½	21,406	287
Other small tribes	15,611	9,285,711	2,215
	64,236	41,100,915	78,403

Population.—In the absence of a census and in consequence of tribal and race inter-marriages, it is impossible to obtain complete vital statistics; but the foregoing estimates were deemed substantially correct 1885.

IN'DIAN TOBAC'CO: see LOBELIA.

IN'DIAN YEL'LOW, or PURREE, *pėr'rĕ:* coloring matter highly esteemed by artists. It is exported from the E. Indies in masses of three or four ounces weight, of dark brown color externally, but of bright orange yellow in the interior. It is generally believed to be a urinary sediment of the camel or buffalo, after the animal has fed on decayed and yellow mango leaves. Its odor is peculiar, and resembles that of castoreum. This substance consists chiefly of the magnesian salts of an acid termed *purreic* or *euxanthic acid.* It is almost insoluble in cold water or alcohol, but is soluble in hot alcohol and in ether; it dissolves freely also in boiling dilute hydrochloric acid, from which stellate groups of acicular crystals of euxanthic acid ($C_{19}H_{16}O_{10}$) are deposited on cooling. Alkaline solutions dissolve this acid, and form a yellow liquid. A solution of euxanthate of potash when mixed with the solutions of the salts of the earths, gives brilliant yellow, sparingly soluble precipitates, and, with acetate of lead, it forms a yellow insoluble lake. By dry distillation, this acid yields a yellow, crystalline sublimate of *purrenone* or *euxanthone,* water and carbonic acid being evolved; and, with nitric acid, it yields several nitrogenous bodies of considerable interest.

INDICAN, n. *ĭn'dĭ-kăn* [from *indigo*]: a colorless substance related chemically to indigo, found in woad, in most plants yielding indigo-blue, and in human urine.

INDICATE, v. *ĭn'dĭ-kāt* [L. *ĭndĭcātus,* pointed out—from *in,* into; *dĭcārĕ,* to proclaim or make known]: to point out; to discover; to direct the mind to a knowledge of something that is not present or has not occurred; to show by symptoms, as a disease. IN'DICANT, n. *-dĭ-kănt,* that which indicates or points out. IN'DICATING, imp. IN'DICATED, pp. INDICATOR, n. *ĭn'dĭ kā-tėr* [F. *indicateur*]: he who or that which points out; a gauge or diagram for showing the effective working power of on engine; a water-gauge in a steam-engine; in *anat.,* the muscle which extends the forefinger. IN'DICA'TION, n. *-shŭn* [F.—L.]: token; symptom; that which serves to discover. IN'DICA'TORY, a. *-tėr-ĭ,* serving to show or make known. INDICATIVE, *ĭn-dĭk'ă-tĭv* [F. *indicatif*—from L. *indĭcātīvus*]: serving to show or make known; the form of the verb which simply affirms or denies. INDIC'ATIVELY, ad. *-lĭ.*—SYN. of 'indicate': to show; exhibit; display; disclose; demonstrate; evince; manifest; argue; mark; signify; denote;—of 'indication': sign; mark; note; in *OE.,* discovery; information, explanation.

INDICOLITE, n. *ĭn'dĭ-kō-līt* [*indigo,* and Gr. *lithos,* a stone]: an indigo-blue variety of tourmaline.

INDICT, v. *ĭn-dīt'* [OF. *indicter*—from L. *indictus,* declared or made known—from *in,* in or on; *dīcĕrĕ,* to speak or say (see INDITE)]: to accuse or charge with a crime or misdemeanor, formally or in writing, as by a grand jury. INDICT'ING, imp. INDICT'ED, pp. INDICT'ER, n. *-er,* one who. **Indict'able**, a. *-ă-bl*, that may be indicted. **Indict'ment**, n. *-dīt'mĕnt*, a formal charge; the paper or parchment containing the charge. **Indict'ee**, n. *-ē*, the person indicted. *Note.*—The spelling of **Indict** is Latin, while its pronunciation shows clearly that the word comes to us from the French.

INDICTION, n. *ĭn-dĭk'shŭn* [F. *indiction*, an indiction —from L. *indictĭōnem*, a declaration or imposition of a tax— from *in*, in or into; *dīcō*, I proclaim—*lit.*, the laying on of an impost or tax]: period or cycle of 15 years. **Indictive**, a. *-tĭv*, proclaimed; declared.—The origin of *Indiction* as a chronological period is not known. Connecting the original meaning of the word, 'the imposition of a tax,' with its signification in chronology, several writers have propounded theories explanatory of its origin, none of which are supported by any evidence. It began to be used in reckoning time, chiefly by ecclesiastical historians, during the life of Athanasius; it was afterward adopted by the popes, who continue to use it, and through whose influence it come to be so generally employed during the middle ages, that the dates of charters and public deeds of this era are expressed in indictions as well as in years of the Christian era. The time from which reckoning by indictions commenced, is, according to some, 312, Sep. 15; according to the Greeks of the Lower Empire, 312, Sep. 1; but when this method was adopted by the popes, it was ordered to be reckoned as commencing 313, Jan. 1. The latter only is now used, and is called the *Papal Indiction*. If we reckon backward to the commencement of the Christian era, it will be seen that 1 A.D. does not correspond to the 1st, but to the 4th year of an indiction—hence, *if to any given year of the Christian era* 3 *be added, and the sum divided by* 15, *the remainder will give the position of that year in an indiction*—e.g., 1880 was the 8th year of an indiction.

INDICT'MENT: accusation or charge in writing against a person or persons of a crime or misdemeanor emanating from a legally constituted grand jury. Where a charge is laid by a citizen or official against an individual, corporation, or a thing (as constituting a public nuisance), and evidence is produced to substantiate it, the jurors *indict;* but where the jurors of their own volition or by direction of a court seek out evidence themselves against a person or a thing they *present* the person or thing. With this technical difference between the two acts, it will at once appear that while every indictment is a presentment, not every presentment isan indictment. In the United States the exact form of drawing indictments is usually declared by state statutes; and these are so explicit that the use of certain words and expressions is mandatory, viz: 'traitorously,' in a charge of treason; 'feloniously,' in felony; burglariously,' in burglary; 'took and carried away,' in larceny; 'maim,' in mayhem, etc., and in the conclusion of the I. 'against the peace and dignity of the' city, state, or nation, and 'contrary to the form of the statute in such case made and provided.' An I. consists of three parts; the *caption* which records the time, place, and circumstances of the finding; the *statement* which details the offense charged and presents the facts connected with it with extreme particularity; and the *conclusion* which must be drawn in the phraseology of the state statute, the evidence in support of the charge is wholly or largely *ex-parte*, or from the side of the person or persons seeking the I. If the grand jury or a majority of them believe from the statement of facts and the evidence laid before them that the accused is guilty as charged, the foreman of the jury indorses on the back of the I. 'a true bill,' and the I. is then said to be 'found.' An I. charges a particular offense, and if the offense consisted of separate actions, each one must be specifically set forth, and such are known as 'counts;' conviction may be had on one or more, or on all the counts. An error, even verbal in drawing an I. often renders the whole presentment defective and invalid, and causes the dismissal of the complaint by the court. When the I. is completed it is handed to the clerk of the court having jurisdiction and entered on the docket for a hearing. Modern practice gives the person, corporation, or representative (owner, lessee, or agent) of the thing indicted a right to a copy of the I.; but under old English practice he was either not allowed to obtain detailed knowledge of it, or was merely permitted to hear it read through before pleading to it.

INDIFFERENT, a. *ĭn-dĭf-fėr-ĕnt* [F. *indifférent*—from L. *indiffĕren′tĕm*, indifferent, careless—from *in*, not; *diffĕrō*, I differ]: not inclined to one more than another; neither good nor bad in reference to quality; feeling no interest or anxiety; impartial; passable. INDIF′FERENTLY, ad. *-lĭ*, without distinction or preference; equally; impartially; in a neutral state; tolerably. INDIF′FERENCE, n. *-ĕns* [F.], or INDIF′FERENCY, n. *-ĕn-sĭ*, carelessness, unconcern, neutrality of mind between persons or things; impartiality. INDIF′FERENTISM, n. *-ĭzm*, system or state of indifference; in *metaphysics*, theory of a school of philosophers, that the human will acts in utter indifference to all motives, and chooses merely as a judge decides; opposite to determinism (q.v.). These philosophers distinguish the human will from the human nature. For a theological defense of indifferentism, see Bp. King, *De Origine Mali.*—See FREE-WILL: WILL.—SYN. of 'indifference': apathy; insensibility; negligence; insignificance; passableness; mediocrity; impartiality; unconcernedness; neutrality; inattention; disregard.

INDIGENCE: see under INDIGENT.

INDIGENOUS, a. *ĭn-dĭj′ĕ-nŭs* [L. *indĭgĕnus*, native; *ĭndigĕna*, a native, born and bred in the same country or town: It. *indigeno:* F. *indigène*]: born in a country, applied to persons; not exotic or introduced, applied to plants.

INDIGENT, a. *ĭn′dĭ-jĕnt* [F. *indigent*—from L. *indĭgen′tem*, needy, poor: It. *indigente*]: poor; needy; destitute; necessitous. IN′DIGENTLY, ad. *-jĕnt-lĭ*. INDIGENCE, n. *ĭn′dĭ-jĕns* [F.], or IN′DIGENCY, n. *-jĕn-sĭ*, want; poverty.—SYN. of 'indigence': penury; destitution; need; pauperism.

INDIGESTED, a. *ĭn'dĭ-jĕs'tĕd* [*in*, not, and *digested:* F. *indigeste*, undigested—from L. *indīges'tus*, confused, disordered]. not regularly disposed; not formed or shaped; not changed or prepared in the stomach for nourishing the body; not well considered or matured. **INDIGESTIBLE**, a. *ĭn'dĭ-jĕs'tĭ-bl*, not easily digested; not to be patiently endured. **IN'DIGES'TIBLY**, ad. *-blĭ*. **IN'DIGEST'ION**, n. *-jĕs'-tyŭn* [F.—L.]: a painful or imperfect change of food in the stomach while preparing for the nourishment of the body, want of due digestion; dyspepsia.

INDIGEST'ION, or **DYSPEP'SIA**: term vaguely applied to various forms of disease of the stomach or of the small intestines in which the natural process of digesting and assimilating the food is deranged.

The symptoms of I. are not constant in all cases. There is often *anorexia* (or want of appetite), but occasionally the appetite is excessive, and even ravenous. Nausea not unfrequently comes on soon after a meal; while in other cases there is no nausea, but after the lapse of a couple of hours, the food is vomited, the vomited matters being very acid, and often bitter, from the admixture of bile. In severe cases the vomiting has been known to occur after every meal for several months. Flatulence, relieving itself in eructations, is one of the standard symptoms of this affection, the gas that gives rise to this symptom being sometimes evolved from undigested matters in the stomach, and sometimes being apparently secreted by the walls of that viscus. It is very apt to occur in dyspeptic patients if they have fasted rather longer than usual. *Cardialgia* (popularly known as *heartburn*), *Pyrosis* (q.v.), or water-brash, and *Gastrodynia* (commonly designated *spasm* or *cramp* of the stomach, and coming on at uncertain intervals in most severe paroxysms), are less common symptoms of indigestion.

The treatment of I. is more dietetic than medicinal. The quantity of food which can be dissolved by the gastric juice and intestinal fluids being limited (see DIGESTION), care should be taken that this quantity is not exceeded; moreover, the meals should not succeed each other too rapidly. Mr. Abernethy, who was a great authority on this subject, laid great stress on the principle, that the stomach should have time to perform one task before another was imposed upon it, and he always recommended his patients to allow six hours to intervene between any two meals. As to the nature of the food best suited to dyspeptic persons—a mixture of well-cooked animal and vegetable food is in general more easily digested than either kind exclusively. Mutton, fowls, and game are the most digestible kinds of animal food; and pork and all cured meats, such as salted beef, ham, tongue, etc., should be avoided. Raw vegetables, such as salads, cucumbers, etc., also must be prohibited. In most cases, dyspeptic persons would probably do well to avoid all stimulating drinks; but in some cases, a little cold, weak brandy and water, or a glass of old sherry, or a little bitter ale, may be taken with advantage. But on all points of eating and drinking, a sensible patient must be influenced mainly by his own experience. The unquestionable benefit which dyspeptic patients often derive from a visit to a hydropathic establishment is due perhaps not so much to any specific action of the water, as to the well-regulated diet, the withdrawal of the mind from personal cares, and the change of scene. A six weeks' or two months' tour among the mountains, or a voyage of some length, will in the same way often do a dyspeptic patient more good than any amount of medication at home.

Treatment of some of the most urgent individual symptoms. Loss of appetite may be remedied by the use of bitters, such as quinine, gentian, chiretta, etc., or of mineral acids, or of both combined. Nausea and vomiting may be treated with hydrocyanic acid, chloroform, and creosote in very small doses: these dangerous drugs should be taken only under medical advice. Two or three drops of dilute hydrocyanic acid in an effervescent draught are often an effectual remedy. In intense vomiting, the amount of food taken at a time must be reduced to the lowest possible limit. A tablespoonful of milk, mixed with lime-water, will sometimes remain on the stomach after all other kinds of food have been rejected. There is no better remedy for flatulence than peppermint-water; if it fails, a drop of cajeput oil on a lump of sugar may be tried. When the eructations are attended with an odor of rotten eggs—that is to say, when sulphuretted hydrogen is evolved from the decomposition of matters in the stomach—an emetic is the best cure. The remedies for the pain in the stomach vary with the character of the pain; bismuth, nitrate of silver, and opium are often serviceable, but should not be taken without advice. A teaspoonful of the aromatic spirit of ammonia in a wineglass of camphor mixture, often gives instantaneous relief; but this is of a class of medicines which cannot be commended, on account of general effects.

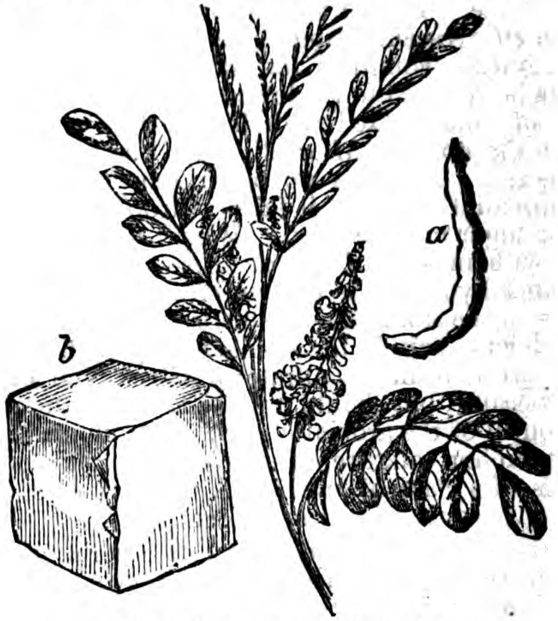
INDIGIRKA, *ĭn-dē-gĭr'kâ:* river of Siberia, in the govt. of Jakutsk, rises in the Yablonoi or Stavonoi Mountains, and after a northerly course, estimated at 750 m., through a frozen desert past a few villages, falls into the Arctic Ocean, lat. 71° n., and long. 150° east.

INDIGN, a. *ĭn-dīn'* [F. *indigne*, unworthy—from L. *indignus*—from *in*, not; *dignus*, worthy]: in *OE.*, unworthy; undeserving; disgraceful. INDIGN'LY, ad. *-lĭ*, in an indign manner; unworthily.

INDIGNANT, a. *ĭn-dĭg'nănt* [L. *indignan'tem*, angry, disdaining—from *in*, not; *dignus*, worthy: F. *indigne*, unworthy]: affected at once with anger and disdain. INDIG'NANTLY, ad. *-lĭ*. IN'DIGNA'TION, n. *-nā'shŭn* [F.—L.]: anger mingled with disdain; strong disapprobation and disgust at flagitious conduct: extreme anger; effects of anger. INDIG'NITY, n. *-nĭ-tĭ* [L. *indignĭtas*, unworthiness: F. *indignité*]: incivility or injury accompanied with insult; contemptuous rudeness; an affront; an outrage. INDIG'NIFY, v. *-nĭ-fī* [L. *făcĭō*, I make]: in *OE.*, to treat unbecomingly or disdainfully: see DIGNIFY.—SYN. of 'indignation': resentment; anger; ire; wrath; fury; rage.

INDIGO, n. *ĭn'dĭ-gō* [F. *indigo;* It. *indaco;* Sp. *indico*—from L. *indĭcum*—from *indĭcus* (Gr. *indĭkon*), Indian]: a beautiful blue dye, obtained from the leaves of certain plants; the two most common are *Indĭgŏf ĕră tinctōrĭă*, and *I. cærûlĕă*, ord. *Legumĭnōsæ*, sub-ord. *Papĭlĭōnācĕæ*. INDIGOGEN, n. *ĭn'dĭ-gō-jĕn* [Gr. *gennăō*, I produce]: white or deoxidized indigo. INDIGOMETER, n. *ĭn'dĭ-gŏm'ĕ-tėr* [Gr. *metron*, a measure]: an instr. for testing indigo. IN'DIGOM'ETRY, n. *-trĭ*, the art of testing indigo. IN'DIGOT'IC, a. *-gŏt'ĭk*, applied to an acid formed from indigo. IN'DIGOTINE, n. *-tēn*, pure indigo-blue.

IN'DIGO: important vegetable dyestuff, yielding a beautiful blue and very durable dye, the basis also of the best black dye in woolen cloths. It has been used in India from a very early period, and was imported thence by the ancient Greeks and Romans, but was lost to Europe during great part of the middle ages—though the cultivation of the plant and preparation of the dye were described by Marco Polo in the 13th c.—until re-introduced by the Dutch about the middle of the 16th c. Its use in England, France, and Saxony was then for a considerable time prevented by a strong prejudice against it, arising from the difficulty experienced in fixing the color. Since this has been overcome, the cultivation of plants, producing indigo, long confined to India, has extended to many other tropical and subtropical countries, as Egypt, W. Indies, Mexico, Brazil, etc. These plants generally belong to the genus *Indigofera*, of nat. ord. *Leguminosæ*, sub. ord. *Papilionaceæ*. The keel of the corolla is furnished on both sides with an awl shaped spur. The species of this genus number at least 150, and are natives of almost all tropical and subtrop-



Indigo Plant (*Indigo tinctoria*):
a, pod ; *b*, block of indigo.

ical countries. Of these, *I. tinctoria* is the species most cultivated in India. It is a half-shrubby plant, 2–3 ft. high, with pinnate leaves, which have five or six pair of long-obovate, dull, bluish-green leaflets, and racemes of axillary pale red flowers.

The province of Tinnevelly produces much I. Bengal produces, on an average, about nine million lbs. annually. The sum which Europe annually pays for I. is estimated at eight or ten millions of pounds sterling.

I. is obtained from plants of other genera, particularly from *Wrightia tinctoria* (nat. ord. *Apocynaceæ*), E. Indies; *Baptisia tinctoria* (nat. ord. *Leguminosæ*), N. America, which yields I. of pale color and inferior quality; *Tephrosia tinctoria* (nat. ord. *Leguminosæ*), Malabar; and *T. Apolline* Egypt and Nubia; *Marsdenia tinctoria* (nat. ord. *Asclepiadaceæ*), in Sylhet; and *Polygonum tinctorium* and *P. Chinense* (nat ord. *Polygonaceæ*), China and Japan.—*Wrightia tinctoria* is a large shrub, indigenous to great part of India and to Ceylon, yielding I. of the finest quality, and is recommended by Dr. Roxburgh for cultivation, as less dependent than the common I. plants on rain and irrigation. It grows very freely, and throws out shoots rapidly on their being cut away.—In times when E. Indian I. was not known, or was brought to Europe only in small quantity, the same dyestuff was obtained from WOAD (q.v.).—A coarse kind of I. called Bastard I., was at one time made in N. America, from the young shoots of *Amorpha cærulea.*

The Manufacture and Applications of Indigo.—The I. plant, in its general appearance, is not unlike the lucerne of our fields. The seed is sown in drills about 10 inches apart, and soon makes its appearance above ground, when it requires incessant care to keep the weeds down, which otherwise would soon choke so tender a crop. In about three months the plants begin to flower, and are then cut down, but soon shoot up again, and yield a second cutting, sometimes a third, the same year. Formerly, I. was carefully dried after being cut, and even fire heat was sometimes used for the purpose, but now—at least in India—the practice is abandoned, and it is found in every respect better to use the plant while fresh and green. The first process is to pack a large vat full of the freshly cut I.; heavy wooden beams are placed on the top to press it down; and water is then let into the vat, enough just to cover it. Being left in this state ten to twelve hours, fermentation is set up, and much gas disengaged, the water becoming a light-green color. The green liquor is then run off into the second vat, which is placed below the level of the first, in which, while the fermentation process is being repeated on a fresh supply in the first vat, it is violently agitated by being beaten with poles: this causes the *grain,* as it is called, to separate and the green matter suspended in the liquor becomes blue and granular. When this operation is sufficiently advanced, the contents of the vat are allowed to settle, and the sediment is then run into the third vat, which is below the level of the second; from which it is pumped into a boiler. The boiler is slightly heated, and then allowed to stand for a few hours, during which time the I. settles down, and as much clear water as possible is drawn off from above it. The boiler is then again heated, and this time up to the boiling-point; after which its contents are allowed to run on to a frame of wood, lined with 'long-cloth' sheeting, where they remain to drain till about the consistence of very thick cream, when they are removed, and subjected to very heavy screw pressure; and when as hard and dry as ordinary soap, are cut by brass wire on a frame into cubes about three inches square; and these are laid out so as not to touch each other, on the shelves of the drying-house. Finally, the cakes are cleaned, one by one, and tightly packed in boxes for the market.

This dye is, without doubt, the oldest in use; the Greeks and Romans obtained a knowledge of its uses from India, where its employment has been very general for a great length of time. Much obscurity involves its early use, in consequence of the variation in its name; for instance, the Tamools of India call the plant *Averie*, and the dye itself *Neelum;* in Sanskrit, the plant is *Vishashodanie*, and the dye *Nīlī* and *Nīlinī*, whence the *Anil* of the Portuguese. The Malays call the dye *Taroom,* and the Arabs, *Neel.*

Commercially speaking, I. may be said to be the produce of India and Central America, as these are the only localities which supply the recognized form of the article. In India, chief seat of the manufacture, Bengal is the most important district. The total quantity received in Great Britain 1876 was more than 88,000 cwts.—a vast quantity, when it is borne in mind with what difficulty it is cultivated and manufactured. When pure, I. has a rich, dark, blue color, almost purple; it is in small cubes or parts of cubes, and its fracture shows a tendency to break up into square pieces, and indicates cracks in its substance, often filled up with a film of whitish efflorescence, probably the lime used in precipitating it. It has neither taste nor smell, and its specific gravity is about 1·50; if rubbed with any hard substance, it gives a streak with a bright coppery lustre. The varieties recognized in commerce are—1st, Bengal, which, from the care taken in its preparation, and the large scale on which it is made in that district, is the best; and its various gradations of quality, ten in number, varying from 9s. to 5s. (abt. $2.16 to abt. $1.20) per lb. are always kept distinct. In other sorts, they are usually much mixed. 2d, Madras and Kurpah; 3d, Oude; 4th, Manilla; 5th, Java; 6th, S. American. The last is packed in serons or cases of dried ox-skin, and its qualities are distinguished as follows: 1st, Flores; 2d, Sobres; and 3d, Cortes; all the others are in wooden chests, containing about 250 lbs. each.

Few materials are of greater importance to the dyer than I. and none require more care and skill in using. Being insoluble in water, it requires the action of other solvents to render it capable of penetrating the fibres of the materials to be dyed. The method generally employed is the following: The I. is broken into small lumps, and these are soaked in hot water, and left for at least 48 hours, in order that the moisture may soak through and soften them; after which they are put into the I.-mill, a levigating machine, consisting of a vessel in which a roller is made to work by machinery, so as to rub down the I. mixed with plenty of water, to a very fine paste. This is a tedious operation; therefore, in large establishments, there are usually numerous mills in the grinding-room. When sufficiently ground, the paste is removed to the dyeing-vat, where to one part of I. is added one part of lime and three-fourths of sulphate of copper; these are well mixed with sufficient water to fill the vat, and the dyer then proceeds to dye either cotton, linen, or silk goods. See DYEING. After being dyed, the goods are dipped into a bath of diluted sulphuric or hydrochloric acid, which gives brightness and purity to the color; they are then finished by washing in a stream of pure water, and drying.

Green indigo, called *Lo-kao* by the Chinese, is a substance resembling I., obtained from a tree called *Hom-bi;* it is highly valued by the Chinese artists as a pigment, and gives a beautiful permanent green color to cotton and silk cloths; it is, however, so costly, that it never can, unless differently prepared, be used as a dyeing material. The fact that the Chinese dye cotton cloths with it, is accounted for by the nature of the process of preparing the lo-kao, which is this: A well-macerated decoction of the bark of the hom-bi tree is largely diluted with water mixed with a little lime; pieces of cotton cloth are then dipped into the vat, and taken out and exposed to the sun, which changes them to a bright green; they are then placed in perfectly clean water, and agitated until the water has removed all the free coloring matter; this water is then evaporated, and the small sediment left is the lo-kao. It is the cotton cloths thus used that are sold as green-dyed goods. It is said that a similar dye stuff is obtained from another tree called *Pa-bi*, and though this, as made by the natives, is much too costly to use in European dyeing, yet probably, if better means of obtaining it can be pointed out, it may become an important article of commerce.

Chemistry of Indigo.—The plants which yield I. present no indication, when growing, that they contain any *chromogen*, or matter capable of yielding pigment, nor is it definitely known in what form the I. exists in the vegetable tissues. The I. of commerce is not a homogeneous body. Its essential and most important constituent is *Indigotin* or *Indigo Blue*, but it likewise contains *Indigo Brown*, *Indigo Red*, and other ingredients.

Indigo Blue. or *Indigotin* ($C_{16}H_{10}N_2O_2$), is obtained from commercial indigo by extracting the ingredients with which it is mixed by acetic acid, alkalies, and boiling alcohol. It occurs either as a dark-blue amorphous powder, or in purple crystalline scales, with a metallic lustre. It is devoid of smell and taste, and is insoluble in water, alcohol, ether, dilute acids, and alkalies. When carefully heated, it may be sublimed without decomposition. Among the products of its destructive distillation are hydrocyanate and carbonate of ammonia, aniline, etc. I.-

blue dissolves without any evolution of gas in strong sulphuric acid, forming a blue solution of *sulphindigotic acid*, extensively used for dyeing cloth, under the name of *Saxony Blue.*

Under the action of reducing agents, such as alkaline fluids containing sulphate of iron, or a mixture of grape-sugar, alcohol, and strong soda lye, I. blue becomes converted into *Indigo White* or *Reduced Indigo*, which forms a yellow solution in alkaline fluids, but which, on free exposure to the air, absorbs oxygen, and is reconverted into I.-blue. Indeed, this is the best method of obtaining the latter in a state of purity from commercial I. of which it should form about 50 per cent.

In 1881 it was announced that perfect *artificial* I. had been successfully and economically manufactured by an ingenious chemical synthesis from phenylacetic acid and other like substances. See *Nature*, XXIII.

I.-blue occurs in small quantity in the urine of man, the horse, and the cow, and occasionally in the milk of the cow, when these fluids have been exposed for some time to the action of the air; but is so usual in urine, that Indican (the chromogen yielding I.-blue) must be regarded as a normal urinary constituent.

Indigo White or *Reduced Indigo*, in a state of purity, occurs in white flakes, which are devoid of taste or smell. are perfectly neutral, and are insoluble in water, but dissolve in alcohol, ether, and alkaline solutions. Its composition is represented by the formula $C_{16}H_{12}N_2O_2$, and as it differs from I.-blue, $C_{16}H_{10}N_2O_2$, only in containing two more equivalents of H, it may be considered as the hydride of the latter. If yarn or woven goods be immersed in an alkaline solution of this substance till they are thoroughly saturated, and are exposed then to the air, I.-blue is formed within the fibres of the tissue. The blue dye thus obtained is very intense and permanent. From its property of becoming blue on exposure to the air, indigo white is a sensitive test for the presence of free oxygen.

Many compounds of great chemical interest have been derived from I.-blue. It was from I. that aniline (used for the production of the pigments *mauve* and *magenta*) was first obtained.

IN'DIGO BIRD (*Cyanospiza cyanea*): N. American bird of the Finch family (*Fringil'idæ*), native of the United States, as far n. as the Missouri, which it visits in summer, and of Central America, where it spends the winter. It is about 5½ inches in length, of a beautiful blue color, variously tinged and shaded, the lores and angles of the chin velvet black. It frequents open places on the edges of woods, and delights to sit singing on the top of a high tree. Its song is very sweet. It is easily domesticated, and is much in request as a cage-bird.

INDIMINISHABLE, a. *ĭn'dĭ-mĭn'ĭsh-ă-bl* [*in*, not, and *diminishable*]: that cannot be lessened.

INDIRECT, a. *ĭn'dĭ-rĕkt'* [F. *indirect*—from L. *indīrec'tus*, not direct; *in*, not, and Eng. *direct*]: not direct; circuitous; not straightforward; unfair; dishonest. IN'DIRECT'LY, ad. *-lĭ.* IN'DIRECT'NESS, n. deviation from an upright or straightforward course; unfairness. INDIRECTION, n. *ĭn'dĭ-rĕk'shŭn*, in *OE.*, oblique means; dishonest practice. INDIRECT TAXES, taxes levied on commodities from the producer or importer only, the share of the taxes to the consumer being included in the price he pays for the commodities.

INDISCERNIBLE, a. *ĭn'dĭz-zėrn'ĭ-bl* [*in*, not, and *discernible*]: not visible or perceptible; indistinguishable. IN'DISCERN'IBLY, ad *-blĭ.* IN'DISCERN'IBLENESS, n. *-bl-nĕs.*

INDISCERPTIBLE, a. *ĭn'dĭs-sėrp'tĭ-bl* [L. *in*, not; *discerptus*, plucked or torn to pieces]: that cannot be destroyed by dissolution or separation of parts. IN'DISCERP'TIBLY, ad. *-blĭ.*

INDISCOVERABLE, a. *ĭn'dĭs-kŭv'ėr-ă-bl* [*in*, not, and *discoverable*]: that cannot be discovered.

INDISCREET, a. *ĭn'dĭs-krēt* [*in*, not, and *discreet:* F. *indiscret*—from mid L. *indiscrētus*]: imprudent; inconsiderate; rash. IN'DISCREET'LY, ad. *-lĭ.* IN'DISCRE'TION, n. *-krĕsh'ŭn* [F.], or IN'DISCREET'NESS, n. want of discretion; imprudence.—SYN. of 'indiscreet': heedless; incautious; inconsiderate; injudicious; hasty.

INDISCRIMINATE, a. *ĭn'dĭs-krĭm'ĭ-nāt* [*in*, not, and *discriminate:* L. *indiscrimĭnātim*, without distinction—from *in*, not; *discrimĭnātim*, distinctly]: without making any distinction; promiscuous; confused. IN'DISCRIM'INATELY, ad. *-lĭ.* IN'DISCRIM'INATING, a. not making any distinction. IN'DISCRIM'INA'TION, n. *-shŭn*, the quality of being indiscriminate; want of distinction. IN'DISCRIM'INATIVE, a. *-tĭv*, making no distinction.

INDISPENSABLE, a. *ĭn'dĭs-pĕn'să-bl* [F. *indispensable: in*, not, and Eng. *dispensable*]: that cannot be omitted or spared; absolutely necessary. IN'DISPEN'SABLY, ad. *-blĭ.* IN'DISPEN'SABLENESS, n. *-bl-nĕs*, or IN'DISPEN'SABIL'ITY, n. *-bĭl'-ĭ-tĭ*, state of not being able to be spared or dispensed with.

INDISPOSE, v. *ĭn'dĭs-pōz* [F. *indisposer*, to indispose: OF. *indispos*, sickly, ill-disposed: *in*, not, and Eng. *dispose*]: to disincline; to make averse to; to disorder slightly, applied to health. IN'DISPOS'ING, imp. IN'DISPOSED', pp. a *-pōzd'*, averse to; unwilling; not in perfect health. INDISPOSITION, n. *ĭn-dĭs'pō-zĭsh'ŭn* [F.—L.]: aversion; dislike; slight disorder.

INDISPUTABLE, a. *ĭn-dĭs'pū-tă-bl* [F. *indisputable*—from L. *in*, not; *dispŭtābĭlĭs: in*, not, and Eng. *disputable*]: not to be disputed; that is not to be questioned; undeniable; incontestable. INDIS'PUTABLY, ad. *-blĭ.* INDIS'PUTABLENESS, n. *-bl-nĕs.*—SYN. of 'indisputable': incontrovertible; indubitable; unquestionable; irrefragable; positive; certain; undoubted; evident; clear; plain.

INDISSOLUBLE, a. *ĭn-dĭs'so-lū-bl* [F. *indissoluble*—from L. *indissŏlū'bĭlĭs: in*, not, and Eng. *dissoluble*]: not capable of being dissolved; not separable; firm; binding or subsisting perpetually. INDIS'SOLUBLY, ad. *-blĭ*, in a manner resisting all separation or dissolving power. INDIS'SOLUBLENESS, n. *-bl-nĕs*, or INDIS'SOLUBIL'ITY, n. *-bĭl'ĭ-tĭ* [F. *indissolubilité*]: the quality of being not capable of being dissolved or melted; binding force.

INDISSOLVABLE, a. *ĭn'dĭz zŏl'vă-bl* [*in*, not, and *dissolvable*]: incapable of being dissolved or separated into parts; subsisting perpetually; not to be broken or dissolved.

INDISTINCT, a. *ĭn'dĭs-tĭngkt'* [F. *indistinct*—from L. *indistinctus: in*, not, and Eng. *distinct*]: not plainly marked; obscure; confused; faint; imperfect. IN'DISTINCT'LY, ad. *-lĭ*. IN'DISTINC'TION, n. *-tĭngk'shŭn*, confusion: uncertainty; also IN'DISTINCT'NESS, n. *-nĕs.*—SYN. of 'indistinct': uncertain; undefined; undistinguishable; vague; indefinite; ambiguous.

INDISTINGUISHABLE, a. *ĭn'dĭs-tĭng'gwĭsh-ă-bl* [*in*, not, and *distinguishable*]: that cannot be distinguished or separated.

INDITE, v. *ĭn-dīt'* [OF. *endicter*—from L. *indictus*, published, announced—from *in*, into; *dīcĕrĕ*, to speak: mid. L. *indictārĕ*, to accuse—from L. *dictārĕ*, to declare, to dictate (see INDICT)]: to direct, suggest, or prompt what is to be uttered or written; to compose; to commit words to writing. INDI'TING, imp. INDI'TED, pp. INDI'TER, n. one who. INDITE'MENT, n. act of inditing. *Note.*—There can be no doubt that the meanings of the mid. L. words *dictārĕ*, to dictate, *indicārĕ*, to point out, and *indictārĕ*, to accuse, have influenced the meanings of *indite;* and the influence of *dĭcārĕ* cannot be separated from that of *dīcĕrĕ* in the consideration of both *indite* and *indict:* see Skeat.

INDIUM, n. *ĭn'dĭ-ŭm* [formed from *indigo*, referring to its indigo colored lines in the spectrum]: an elementary body, an extremely rare metal discovered in 1863: see RUBIDIUM.

INDIVIDABLE, a. *ĭn'dĭ-vī'dă-bl* [*in*, not, and *dividable*]: in *OE.*, that cannot be separated into parts; indivisible.

INDIVIDUAL, n. *ĭn'dĭ-vĭd'ū-ăl* [F. *individuel;* It. *individuale*, individual—from L. *individŭŭs*, not divided or separated—from *in*, not; *dīvĭdo*, I divide]: one incapable of divison or separation; a single one; a single person; a single animal, plant, or thing: ADJ. single. IN'DIVID'UALLY, ad. *-lĭ*, separately; with a separate and distinct existence; inseparably. IN'DIVID'UAL'ITY, n. *-ĭ-tĭ* [F. *individualité*]: separate or distinct existence. In *nat. history*, there is some debate as to what constitutes individuality; similarly in metaphysical science: and it is to be conceded that in a class of cases individuality is a relative term whose use requires to be accompanied with explanation. It denotes also a character or property peculiar to an individual; distinctive character: also a phrenological organ, supposed to indicate originality and independence. IN'DIVID'UALIZE, v. *-ăl-īz*, to distinguish from others; to invest with the character of individuality; to particularize. IN'DIVID'-

UALIZING, imp. **IN'DIVID'UALIZED**, pp. *-īzd*. **IN'DIVID-UALIZA'TION**, n. *-ăl-ī-zā'shŭn*, the act of individualizing; the state of being individualized. **IN'DIVID'UALISM**, n. *-ăl-ĭzm*, the quality of being individual; an excessive or undue attachment to the interests of individuals; self-interest. **IN'DIVID'UATE**, v. *-vĭd'ū-āt*, to make single; to distinguish from others. **IN'DIVID'UATING**, imp. **IN'DIVID'UATED**, pp. **IN'DIVID'UA'TION**, n. *-ā'shŭn*, the act of making single; that which makes an individual.—SYN. of 'individual, a.': particular; solitary; undivided; distinctive; indivisible.

INDIVISIBLE, a. *ĭn'dĭ-vĭz'ĭ bl* [F. *indivisible*—from mid. L. *indivīsib'ĭlĭs: in*, not, and Eng. *divisible*]: that cannot be divided, separated, or broken: N. an elementary part or particle. **IN'DIVIS'IBLES**, n. plu. *-blz*, in *math.*, elements infinitely small, known as points—according to the theory that a volume or mass is composed of an infinite number of planes, a plane of an infinite number of lines, and a line of an infinite number of points: thus the point becomes the atom of mathematics, and is indivisible. The method of infinitesimals (q.v.) is applied to solve the problems which geometricians in the middle ages solved by the method of indivisibles. **IN'DIVIS'IBIL'ITY**, n. *-bĭl'ĭ-tĭ* [F. *indivisibilité*]: the property of not being separable into parts. **IN'DIVIS'IBLY**, ad. *-blĭ*.

IN'DO CHI'NA, or FARTHER INDIA, or the IN'DO-CHI'NESE' PENIN'SULA: see ANAM: COCHIN CHINA: COCHIN CHINA, LOWER: BURMAH: SIAM.

INDOCILE, a. *ĭn-dŏs'ĭl*, or *-dō'sīl* [F. *indocile*—from L. *indŏc'ĭlĭs*, that cannot be taught—from *in*, not; *dŏcĕō*, I teach: It. *indocile*]: not teachable; not tractable; not easily instructed; dull; also sometimes **INDOC'IBLE**, a. *-ĭ bl*. **INDOCILITY**, n. *ĭn'dō-sĭl'ĭ-tĭ*, unteachableness; dulness of intellect.

INDOCTRINATE, v. *ĭn-dŏk'trĭn-āt* [L. *in*, in; *doctrīnă*, doctrine: F. *endoctriner*, to indoctrinate]: to teach; to instruct in the rudiments or principles of any branch of knowledge. **INDOC'TRINATING**, imp. **INDOC'TRINATED**, pp. **INDOC'TRINA'TION**, n. *-ā'shŭn*, instruction in the rudiments, as of a science; communication of doctrine.

IN'DO-GERMAN'IC LAN'GUAGES: see ARYAN.

INDOLENT, a. *ĭn'dō-lĕnt* [F. *indolent;* It. *indolente*—from mid. L. *indŏlen'tĕm*—from L. *in*, in; *dolērĕ*, to feel pain—*lit.*, free from pain]: habitually idle; indisposed to labor or exertion; slothful; lazy; careless. **IN'DOLENTLY**, ad. *-lĭ*. **IN'DOLENCE**, n. *-lĕns* [F.—from L. *indolen'tĭă*, freedom from pain]: habitual or constitutional idleness; laziness; dislike to exertion.—SYN. of 'indolent': idle; inert; sluggish; inactive; listless; inattentive.

INDOMITABLE, a. *ĭn-dŏm'ĭ-tă-bl* [L. *indŏmĭtus*, untamed, that cannot be checked—from *in*, not; *domĭtārĕ*, to tame: F. *indomptable*]: that cannot be subdued; untamable; irrepressible.

INDOORS, a. *ĭn'dōrz* [*in*, and *doors*]: being within the house.

INDORE, *ĭn dōr′*: Mahratta principality of Hindustan, consists of several detached tracts, some very remote from each other. The country, including all between its extremes, stretches in n. lat 21° 18′—24° 46′, and in e. long. 74° 39′—76° 26′; aggregate area, 8,075 sq. m. The climate is sultry, the thermometer ranging from 60° to 90° F. in the shade. The territory, as a whole, is traversed from e. to w. by the Nerbudda river, also by the Vindhya Mountains, their loftiest point within its limits being 2,500 ft. above the sea. The revenue is nearly a quarter of a million sterling; and the armed force amounts to about 20,000 men. Besides the capital, the chief towns are Rampûra, Mehadpore, Dhi, Pitlaud, Mundlaisir, Bhanpûra, and Mhow. I. is peculiarly the country of the Bheels, one of the wildest and most savage of the aboriginal tribes of India. Total pop. (1881) 1,054,237.

INDORE′: capital of the principality of I.; n. lat. 22° 42′, and e. long. 75° 50′; on the left bank of the Kuthi; about 2,000 ft. above sea-level. This place, mean and insignificant in itself, acquired notoriety in connection with the great revolt of 1857. Though Holkar, the rajah, remained faithful to the British govt., yet his troops mutinied July 1, holding the prince as a prisoner in his own palace, and butchering many Europeans, men, women, and children, in cold blood. I. is of modern erection, founded 1767; and its original namesake, now Jemnah, is still seen on the opposite bank of the river. Pop. of I., estimated 15,000.

INDORSE, v. *ĭn-dŏrs′*, sometimes less correctly, ENDORSE [OF. *endosser;* Sp. *endorsar*, to write one's name on the back of a bill of exchange—from mid. L. *indorsārĕ*, to place upon the back—from L. *in*, on; *dorsum;* F. *dos*, the back]: to write on the back of any written paper; to transfer or assign by writing one's name on the back of a note or bill of exchange; to approve. INDOR′SING, imp. INDORSED′, pp. *-dŏrst′*. INDOR′SABLE, a. *-să-bl*, that may be indorsed. INDOR′SER, n. one who writes his name on the back of a bill of exchange, and thus makes himself liable for its payment. INDORSE′MENT, n. sanction or approval; that which is written on the back, as of a bill of exchange; also IN′DORSA′TION, n. *-sā′shŭn*. *Indorsement* is the term generally used to denote the writing of the name of the holder on the back of a bill of exchange, check, or promissory note, on transferring or assigning it to another. Signing the name 'A. B.' alone is a blank indorsement; and if the transferee is named, it is a special indorsement. The usual form is, 'Pay C. D. or order. (Signed) A. B.'; or 'Pay to the order of C. D. (Signed) A. B.' When personal liability is to be avoided, the words 'without recourse' are added. The word indorsement is used frequently also in law, to denote any matters written or indorsed on the back of writs or deeds, e.g. on declarations, on writs of summons, etc. IN′DORSEE′, n. *-sē*, the person to whom a note or bill of exchange is indorsed.

INDORSED′, or **Endorsed′**, or **Addorsed′**, in Heraldry: terms applied to two animals placed back to back. Two keys, two wings, etc., also may be indorsed, and a pelican is drawn always with his wings indorsed.

INDRA, n. *ĭn′dră* [from Sanskrit *id*, which probably meant 'to see, to discover,' hence literally, 'he who sees or discovers,' scil., the doings of the world; another derivation makes the word mean literally 'giver of rain']: one of those Hindu deities that were worshipped especially in the Vedic period of the Hindu religion, but had great legendary popularity also in the Epic and Purâñic periods: see India, *Religion*. In that class of R′ig-Veda hymns which there is reason to deem the oldest portion of Vedic poetry, the character of I. is that of a mighty ruler of the bright firmament, and his principal feat is the conquest of the demon *Vr′itra*, a symbolical personification of the cloud which obstructs the clearness of the sky, and withholds the fructifying rain from the earth. In his battles with Vr′itra, he is therefore described as 'opening the receptacles of the waters,' as 'cleaving the cloud' with his far-whirling thunderbolt,' as 'casting the waters down to earth,' and 'restoring the sun to the sky.' He is, in consequence, 'the upholder of heaven, earth, and firmament,' and the god 'who has engendered the sun and the dawn'—the *Jupiter Pluvius* of India, the god present more often than any other to the minds of Indian worshippers. And since the atmospherical phenomena personified in this conception are ever and ever recurring, he is 'undecaying' and 'ever youthful.' All the wonderful deeds of I., however, are for the benefit of the good only, which in the language of the Veda means the pious men who worship him in their songs, and invigorate him with the offerings of the juice of the Soma plant: see India, *Religion*. He is therefore the 'lord of the virtuous,' and the 'discomfiter of those who neglect religious rites.' Many other epithets illustrate the same conception. It is on account of the paramount influence which the deeds of I. exercise on the material happiness of man, that this deity occupies a foremost rank in the Vedic worship, and that a greater number of invocations are addressed to him than to any of the other gods. But to understand the gradual expansion of his mythical character, and his ultimate degradation to an inferior position in the Hindu pantheon of a later period. it is necessary to bear in mind that, however much the Vedic poets call I. the protector of the pious and virtuous, he is in their songs essentially a warlike god, and gradually endowed by imagination, not only with the qualities of a mighty, but also of a self-willed king. The legends which represent him in this light seem, it is true, to belong to a later class of the R′ig-Veda hymns; but they show that the original conception of I., excluded from his nature those ethical considerations which in time changed the pantheon of elementary gods into one of a different stamp. Whether the idea of an incarnation of the deity, which, at the Epic and Purânic periods, played so important a part in the history of

Vishnu, did not exercise its history as early as the composition of some of the Vedic hymns in honor of I., is matter of doubt. He is, for instance, frequently invoked as the destroyer of cities—of seven, of ninety-nine, even of a hundred cities—and he is not only repeatedly called the slayer of the hostile tribes which surrounded the Aryan Hindus, but some of the chiefs slain by him are enumerated by name. The commentators, of course, turn those 'robbers' and their 'chiefs' into demons, and their cities into celestial abodes; but as it is improbable that all these names should be nothing but personifications of clouds destroyed by the thunderbolt of I., it is, to say the least, questionable whether events in the early history of India may not have been associated with the deeds of I. himself, in like manner as, at the Epic period, mortal heroes were deemed incarnations of Vishnu, and mortal deeds transformed into exploits of this god.

The purely kingly character of I. assumes its typical shape in the *Aitareya Brâhmana*, where his installation as lord of the inferior gods is described with much mystical detail; and from that time he continues to be the supreme lord of the minor gods, and the type of a mortal king. During the Epic and Purânic periods, where ethical conceptions of the divine powers prevail over ideas based on elementary impressions, I. ceases to receive the worship that he had acquired at the Vedic time, and his existence is upheld chiefly by the poets, who work it out in the most fantastical detail. Of the eight guardians of the world, he is then the one who presides over the East, and he is still the god who sends rain and wields the thunderbolt. But poetry is more engrossed by the beauty of his paradise, *Swarga*, the happy abode of the inferior gods, and of those pious men who attain it after death in consequence of having, during life, properly discharged their religious rites; by the charms of his heavenly nymphs, the *Apsarasas*, who now and then descend to earth to disturb the equanimity of austere penitents; by the musical performances of his choristers, the *Gandharvas;* by the splendor of his capital, *Amarâvatî;* by the fabulous beauty of his garden, *Nandana*, etc. A remarkable trait in this legendary life of I. is the series of his conflicts with Krishna, an incarnation of Vishnu, which end, however, in his becoming reconciled with the more important god. As the god who is emphatically called the god of the hundred sacrifices (*S'atakratu*), I. is jealous of every mortal who may have the presumption of aiming at the performance of that number of sacrifices, for the accomplishment of such an intention would raise the sacrificer to a rank equal to that which he occupies. He is therefore ever at hand to disturb sacrificial acts which may expose him to the danger of having his power shared by another Indra. According to the Purânas, the reign of this god I., who is frequently called also *S'akra*, or the mighty, does not last longer than the first *Manwantara*, or mundane epoch. After each successive destruction of the world, a new I. was created, together with other gods, saints, and mortal beings. Thus, the I.

of the second Manwantara is *Vipas'chit;* of the third, *Sus'ânti;* of the fourth, *S'ivi;* of the fifth, *Vibhu;* of the sixth, *Manojava;* and the I. of the present age is *Purandara.* When represented in works of art, I. is generally seen riding on his elephant; and where he is painted, he is covered with eyes.

INDRÂNI: a name of the wife of the Hindu god Indra (q.v.).

INDRAUGHT, n. *ĭn'drâft:* the flow of sea-water at some depth into a land-locked basin to replace that removed by evaporation or outflow at the surface, as in the Red Sea.

INDRE: river of France, rising on the n. border of the dept. of Creuse, flowing n.w. through the depts. of Indre and Indre-et-Loire, and joining the Loire 17 m. below Tours, after a course of 136 m., through the last 40 of which it is navigable.

INDRE, *ăngd'r:* central dept. of France, formed out of the w. portion of the old province of Berri. It is immediately s. of the dept. of Loir-et-Cher. Area, 2,620 sq. m., of which about four-fifths are in tillage and pasture. It is well watered, the chief rivers being the Indre, the Creuse, and its tributary the Anglin. The surface is mostly flat, and the land generally fertile, producing large crops of wheat and barley. The two principal resources of the dept., however, are its vineyards and its flocks. The climate, except in the district of La Brenne, is mild and healthful. The principal manufactures are woolen and linen cloths, hosiery, scythes, paper, and porcelain. Iron-mines are worked. The dept. is divided into four arrondissements—Châteauroux, Le Blanc, Issoudun, and La Châtre. The cap. is Châteauroux. Pop. of dept. (1881) 287,705.

INDRE-ET-LOIRE, *ăngd'r-ā-lwâr':* inland dept. of France, formed out of the ancient province of Touraine; n.w. of the dept. of Indre; 2,350 sq. m., of which more than one-half is arable. The dept. is watered by the Loire, the chief river, and by its tributaries, the Cher, the Indre, and the Vienne, all navigable. The Loire, to prevent inundations which otherwise would be frequent and disastrous, is banked in by dikes throughout its course in this dept.: see LOIRE. In the s., the surface is hilly, and either waste or wooded, but in the other districts it is undulating or flat, and very fertile. Of the products, which include an abundant yield of the ordinary bread-stuffs, wine, of which about 14,000,000 gallons are made in ordinary years, is one of the most important. The chief manufactures are bar-iron, powder, files, woolen cloth, silk, and leather. The dept. is divided into the three arrondissements of Tours, Chinon, and Loches; cap. Tours. Pop. of dept. (1881) 329,160.

INDRENCH, v. *ĭn-drĕnsh'* [*in*, not, and *drench*]: in *OE.*, to overwhelm with water; to drown; to drench—which see.

INDRI, n. *ĭn'drī,* or INDRIS: lemurine animal about the size of a large cat, native of Madagascar: see **LEMUR.**

INDUBITABLE, a. *ĭn-dū'bĭ-tă-bl* [F. *indubitable*—from L. *indubĭtābĭlĭs*, that cannot be doubted—from *in*, not; *dŭbĭtō*, I doubt: It. *indubitabile*]: not to be doubted; unquestionable; evident. INDU'BITABLY, ad. *-blĭ*. INDU'BITABLENESS, n. *-bl-nĕs*.—SYN. of 'indubitable': undoubted; clear; plain; incontrovertible; incontestable; undeniable; irrefragable.

INDUCE, v. *ĭn-dūs'* [L. *indūcĕrĕ*, to lead or bring in—from *in*, into; *dūcō*, I lead]: to move by persuasion or argument; to prevail on; to cause; to influence by motives. INDU'CING, imp. INDUCED', pp. *-dūst'*. INDU'CER, n. *-sėr*, one who. INDU'CIBLE, a. *-sĭ-bl*, capable of being induced. INDUCE'MENT, n. *-dūs'mĕnt*, motive; anything that leads or influences the mind to will or act.—SYN. of 'induce': to actuate; impel; influence; persuade; produce; effect; superinduce; move; instigate; urge; press; incite;—of 'inducement': reason; influence; persuasion; purpose; object.

INDUCIÆ, n. plu. *ĭn-dū'shĭ-ē* [L. *indūciæ*, a truce, pause, delay]: in *Scotch law*, days of grace; the days which intervene between the citation of a defender, and the day of appearance in the action.

INDUCT, v. *ĭn-dŭkt'* [L. *inductus*, led or brought in—from *in*, in; *dūcō*, I lead]: to introduce, as to an office, or to an eccles. benefice; to put formally into possession. INDUCT'ING, imp. INDUCT'ED, pp. INDUC'TOR, n. *-tėr*, one who. INDUC'TILE, a. *-dŭk'tĭl*, not capable of being drawn into threads, as a metal. IN'DUCTIL'ITY, n. *-ĭ-tĭ*. INDUCTION, n. *ĭn-dŭk'shŭn* [F.—L.]: introduction into an office, as of a clergyman into a benefice, see INDUCTION of Clergyman: entrance; the inference of some general truth from special facts; the method of reasoning from particulars to generals, see INDUCTION, in Reasoning: the influence by which an electric or galvanic current produces magnetic polarity in certain bodies near or round which it passes, see INDUCTION OF ELECTRIC CURRENTS: in *OE.*, something introductory to a play; a preface. INDUC'TIONAL, a. pertaining to. INDUC'TIVE, a. *-tĭv*, leading to inferences; operating by induction. INDUC'TIVELY, ad. *-lĭ*. INDUCT'EOUS, a. *-ē-ŭs*, in *elect.*, rendered electropolar by induction, or brought into the opposite electrical state by the influence of inductive bodies. INDUCTIVE SCIENCE: see under SCIENCE. *Note.*—INDUCTION and INDUCTIVE regard generalizations drawn from the consideration of a number of particular facts; while *deduction* and *deductive* are said of such generalizations when applied to particular facts or cases. By *induction* we establish the law that heat expands bodies; by *deduction* we are enabled to explain by this law why the pendulum, and consequently the clock, moves slower in summer than in winter.

INDUCTION, in Reasoning: one of the great processes of scientific discovery and proof. When we rise from particular facts to generalities, the result may take one of two forms—a general *notion* or a general *proposition:* 'circle' is a notion; 'the circle is the line that incloses the largest space' is a proposition. (See GENERALIZATION.) The mode of arriving at such general affirmations, truths, or laws is what is called induction. The strict meaning of the term is 'the operation of *discovering* and *proving* general propositions;' while deduction, on the other hand, is the method of *applying* general propositions, once discovered, to particular cases considered to be included within their scope. By I. we establish the law that heat expands bodies; by deduction we apply it to explain why a clock is slower in summer than in winter—owing to the changes of the length of the pendulum.

I. is the only process of real inference—in other words, by it we proceed from the known to the unknown; or from a limited range of facts, we affirm what will hold in an unlimited range. All things that we do not know by actual trial or ocular demonstration we know by an inductive operation. Deduction is not real inference in this sense, since the general proposition already covers the case that we apply it to; in a proper deduction, the conclusion is more limited than the premises. By the inductive method, we obtain a conclusion much larger than the premises; we adventure into the sphere of the unknown, and pronounce upon what we have not yet seen. This operation necessarily implies a certain hazard; and it may be easily supposed that there are precautions requisite in working it. Nothing is more common than the making of bad inductions; and accordingly it is now considered a part of logic to lay down the rules for the right performance of this great operation.

A preliminary question arises—How can we ever be entitled to dogmatize beyond the sphere of our actual experience; to conclude, for instance, that five miles below the surface of the earth, there is heat enough to make water boil? The answer to this question supplies us with what is called the *ground of induction*, which is the fact, now established by the experience of centuries, *that nature is uniform.* What has happened once, will happen again, provided the same circumstances and situation of things are exactly repeated. At a former period of the world's history there might have been doubts on this matter, and opinions were actually held that implied a want of perfect uniformity, but now those doubts are dispelled, except, perhaps, with reference to a single question—viz., the freedom of the will (see FREE WILL). Accordingly, the problem to be solved is to ascertain what is the order of nature in the instances accessible to our observation.

The uniformity of nature is a compound of many separate uniformities. In other words, there are different departments or classes of phenomena, each determined by separate laws. Thus, we have mathematical, physical, chemical, physiological laws, the statement of which severally constitutes the subject-matter of each of these sciences. Now, a distinction is observable, which is of some importance as regards the method of inductive investigation. Some of the phenomena thus conjoined under uniform principles are properties *simultaneously* existing, as the properties of mathematical figures; others are *successions*, and affirm order in time, the most important of all which is that peculiar succession denominated cause and effect: see CAUSE. The problem of inductive inquiry is in a great measure occupied with this one department, though there are also inductions respecting contemporaneous or conjoined properties. Natural history is in part made up of affirmations of simultaneous properties, as, for example, the anatomical structure of animals, and in part of affirmations of cause and effect, as in all the operations that sustain life, and determine reproduction, growth, and death.

Respecting the whole of the phenomena implied under Causation, the principal of nature's uniformity is embodied in one great and comprehensive statement, called the law of causation; the import of which is, that whatever begins to exist is uniformly preceded by something else, to which it invariably succeeds. Events do not arise of themselves, or out of nothing; and though there is such a thing as Plurality of Causes, everything that arises is preceded by some other thing as a cause, and always follows when that cause occurs; there being supposed no counteracting agency. The aim of the scientific inquirer, then, is to single out from the mass of circumstances that have accompanied and preceded any event, some one or more that invariably precede the occurrence of that event, which being found, are thenceforth known as its cause. This has to be accomplished by a process technically called *elimination*, by which is understood a series of operations intended to separate everything that is indifferent to the production of the phenomenon, until we arrive at some one thing or more that cannot be removed without making the effect to cease.

John Stuart Mill, in his *Logic*, has illustrated in detail the methods to be adopted for making sure that we have singled out the true causative circumstance from among the many that may precede a given effect. They resolve themselves mainly into two. 'One is, by comparing together different instances in which the phenomenon occurs. The other is by comparing instances in which the phenomenon does occur, with instances *in other respects similar* in which it does not. These two methods may be respectively denominated the Method of Agreement, and the Method of Difference.'

The Method of Agreement supposes that we make it a study to *vary the circumstances* under which the supposed phenomenon is produced. Either by observation of cases presented in nature, or by artificially contriving new cases, in other words, by experiment, we do our utmost to obtain the effect in a great many different connections, whereby we ascertain what things are indifferent to it. Whatever circumstance can be excluded, the phenomenon still happening, or can be absent notwithstanding its presence, is not connected with it in the way of causation. The accidental or indifferent circumstances being thus eliminated, if only one remains, that is the cause; if the elimination does not go so far, but leaves three or four circumstances or agents, we can only say that the cause is among them. Mill enunciates the Method of Agreement in a formal canon, or rule of I. to the following effect: *If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree is the cause (or effect) of the given phenomenon.*

If we could always obtain the requisite variety of circumstances for the exclusion of all indifferent adjuncts, this method would fully answer the ends of inductive inquiry, but this is not always to be had, and even when practicable, the operation is often very laborious. When the other method (Difference) can be applied, the desired end is reached by a shorter route. If, instead of excluding the indifferent agencies one by one, we can contrive an experiment, or make an observation, that excludes *one* agency or circumstance, followed by the cessation of the effect, we conclude at once that what has thus been left out is the cause, or an essential condition or part of the cause. Whenever we are so fortunate as to find two instances suited to this method, we establish causation at once and beyond all question. The *experimentum crucis* of Bacon was something of this nature; only it supposed that a question lay between two alternative or competing agencies, which an experiment had been hit upon for deciding; such an experiment behooved to be one of Difference. This method is embodied in the following canon: *If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance, except one, in common, that one occurring only in the former, the circumstance in which alone the two instances differ is the effect, or cause, or a necessary part of the cause, of the phenomenon.*

These are the two leading methods, but there are certain cases met by a procedure somewhat different. Sometimes we have a phenomenon made up of causes partly known and partly unknown. It is then possible to subduct the effects due to the known causes, and what remains will be attributed to the remaining agencies. This is expressed by Mill in the following rule or canon: *Subduct from any phenomenon such part as is known by previous induction to be the effect of certain antecedents, and the residue of the phenomenon is the effect of the remaining antecedents.* The more our knowledge is extended, the more able are we to proceed on this method, termed the Method of Residues. 'It is by this process, in fact,' says Sir John Herschel, 'that science in its present advanced state is chiefly promoted.'

There remains a class of laws wherein the application of any of those three methods is impracticable, by reason of the fact that the agency in their case is irremovable and indestructible, so that we cannot obtain any cases where it is entirely absent. Such agent is heat, which can never be entirely separated from any body, so as to ascertain, by comparing cases of its presence with those of its absence, what effects are due to it. So we can never pass out of the sphere of the earth's attraction. The difficulty hence arising is surmounted by observing the *variations of degree* of the cause, and whether there be a corresponding variation in the degree of the effect. Thus, we infer that heat is the cause of the expansion of bodies, and that its total absence would lead to their maximum condensation and consolidation, by watching the effects of any additions or subtractions of a body's temperature. Solids, liquids, and gases (with certain limited and special exceptions) are found expanding steadily as they are heated, and contracting as they are cooled; and this is to us a sufficient justification for considering that the law in question holds good. This process is termed by Mill the Method of Concomitant Variations, and is expressed by him in the following terms: *Whatever phenomenon varies in any manner whenever another phenomenon varies in some particular manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation.*

There are many problems growing out of the applications of I. to the great variety of natural phenomena, the main principles being nevertheless the same. An important extension of the means of scientific discovery and proof arises after a certain number of general laws have been discovered, and when phenomena can be shown to be results of the operation of one or more of such laws. Thus, the great I. of universal gravity was applied *deductively* to explain many facts besides those that enabled the induction to be made. Not merely the motions of the planets about the sun, and the satellites about the planets, but the remote and previously unexplained phenomena of the tides, the precession of the equinoxes, etc., were found to be inferences from the general principle. This mode of determining causes is called the Deductive Method. When several agents unite in a compound effect, there is required a process of calculation to find from the effects of the causes acting separately the combined effect due to concurrent action, as when the path of a projectile is deduced from the laws of gravity and of projectile force. It is the deductive stage of science that enables mathematical calculation to be brought into play with such remarkable success as is seen in astronomy, mechanics, etc.: see DEDUCTION.

The fact that phenomena may result from a concurrence of causes, leads to the distinction between ultimate laws and derivative or subordinate laws. Thus, gravity is an ultimate law; the movement of the planets in ellipses is but a subordinate law. These inferior laws may be perfectly true within their own limits, but not necessarily beyond certain limits, of time, place, and circumstance. A different adjustment of the two forces that determine a planet's motion, would cause a circular or a parabolic orbit; and therefore it is, that when phenomena result from a combination of ultimate laws acting under a certain arrangement, they are not to be generalized beyond the sphere where that arrangement holds. These inferior laws are sometimes mere inductions that have not been resolved into their constituent laws, and then they go under the name of 'Empirical Laws.' Thus, in the hands of Kepler, the elliptic orbit of the planets was only an empirical generalization, ascertained by the Method of Agreement: Newton converted it into a derivative law, when he showed that it resulted from the more general laws of gravity, etc. The earlier stages of I. present us with many of those empirical laws; in some subjects—e.g., physiology, medicine, etc.—the greater number of inductions are of this character. The cure of disease is especially an example of this: hardly any medicine can have its efficacy traced to ultimate laws of the human system. Hence the uncertainty attending the application of remedies to new cases, and also the want of success that often attends them in circumstances where we think they ought to succeed.

I. applies to other laws than those of causation—namely, to uniformities of co-existence. For the illustration of these, as well as the other parts of I., see Mill's *Logic*, book iv.

INDUC'TION of Clergymen, in the Church of England: investing or giving possession of a benefice to a clergyman; done by a mandate from the bishop to the archdeacon or corresponding official to make the induction. The inductor takes the clergyman's hand, and lays it on the ring-key or latch of the church-door, then opens the door, and puts him into the church, and generally the church bell is tolled, to give notice to the parishioners. See INSTALLATION: INSTITUTION (in Church Law).

INDUC'TION OF ELEC'TRIC CUR'RENTS: the power (and the action) of electric currents to induce currents in neighboring conducting circuits. This was discovered by Faraday, whose researches on the subject, named by him *volta-electric* induction, were published in the Philosophical Transactions (1831–2). Henry (1832) observed that when contact was broken in a long galvanic circuit a bright spark occurred which did not occur when the circuit was short. This was shown by Faraday (1834) to be due to the extra current induced by the various parts of the circuit in each other. Bachhoffner and Sturgeon (1837) showed the superior action, in induction apparatus, of a bundle of iron wires to that of a solid bar of iron. Henry (1841) studied the inductive action of induced currents of different orders. De la Rive designed, 1843, an electro-chemical condenser, consisting of a primary coil, which, by means of the extra current, could enable a single galvanic cell to decompose water. The same decomposition, however, had been effected by Wright 1840. Ruhmkorff constructed (1850 or 51) the first so-called *induction coil*, the excellence of which was attained chiefly by the proper insulation of the secondary coil. Fizeau (1853) increased immensely the power of the coil, by providing it with a condenser. Of late years, coils of great power have been constructed, rivalling, if not exceeding, the most powerful electric machines in length and power of spark.

INDUCTION OF ELECTRIC CURRENTS.

The fundamental law of current I. may be thus shown. Two long copper wires, *pp* (fig. 1) and *ss*, are fixed so as to be parallel and close to each other. The extremities of the one, *pp*, are in connection with the poles of a galvanic battery, E, and those of the other, *ss*, with the binding screws of a galvanometer, G. The instant the circuit of the battery is completed, and the current sent along *pp*, a current in the opposite direction is induced in the wire *ss*, which is shown by the deflection of the needle of the galvanometer. This induced current is only momentary, for though the current continues to circulate in *pp*, the needle soon falls back to its original position of rest, and the wire *ss* gives free passage to other currents, and appears to be in no way affected. If, now, when the needle is at rest, the battery circuit be broken, and the current in *pp* stopped, another momentary current is indicated by the galvanometer needle, but in this case in the same direction as the inducing current. The inducing wire and current are called *primary*, and are so distinguished from the induced wire and current, which are termed *secondary*. The passive condition of the wire while thus under induction has been described by Faraday as electro-tonic. An electric throb, so to speak, marks the setting in of this state, and another its vanishing; the former in the opposite direction to that of the inducing current, and the latter in the same direction. If the primary wire, *pp*, be movable, so that it can be suddenly brought near to, and withdrawn from the secondary, *ss*, while the battery current passes steadily, currents are induced as in the former case, the approach of the wire being marked by an inverse current, and its withdrawal by a direct one. As long, however, as the primary wire remains in any one position, all evidence of electricity in the secondary wire disappears; but if in this position the strength of the primary current should be increased or diminished, momentary currents in the secondary wire would again mark the changes in the primary, the increase causing an inverse, and the decrease a direct current. Hence we conclude, that *a current which begins, a current which approaches, or a current which increases in strength, induces an inverse momentary current in a neighboring conducting circuit,* and that *a current which stops, a current which retires, or a current which decreases in strength, induces a direct momentary current in a neighboring circuit.* For inverse, the word *negative*, and for direct, the word *positive*, are frequently employed in reference to induced currents.

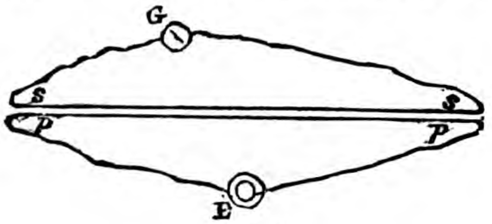


Fig. 1.

INDUCTION OF ELECTRIC CURRENTS.

In experiments like the above, it is much more convenient to wind the primary and secondary wires side by side round a bobbin, so as to form a coil, as in fig. 2. The wires are insulated from each other by a covering of wool or silk. Not only does such a disposition admit of very long wires being used, but it also disposes the wires employed to greater advantage, for each single turn of the primary wire acts not only on the corresponding turn of the secondary wire, but on all the turns near it. The inductive effect of such a coil is much greater than that which would be obtained by the same extent of wires running side by side in a straight or crooked line. It is not necessary even that the two wires be wound round together; each may be wound on a separate bobbin, and the one placed inside the other, as in fig. 3. The primary coil, P, here represented, is made of wire $\frac{1}{12}$ of an inch in diameter, covered with wool; and the secondary coil, S, of silk-covered wire, about $\frac{1}{80}$ of an inch, and much longer than the primary wire. With two such coils, the illustration of the preceding principles of I. can be conveniently given. If the primary coil be placed in the circuit of a galvanic cell, by two loose and flexible wires, so as to allow of its easy motion, and if the terminal binding-screws of the secondary coil be placed in connection with a galvanometer, when P is inserted into S, a momentary inverse current is indicated, and, when it is removed, a momentary direct one; or if, when P remains in S, the strength of the pri-

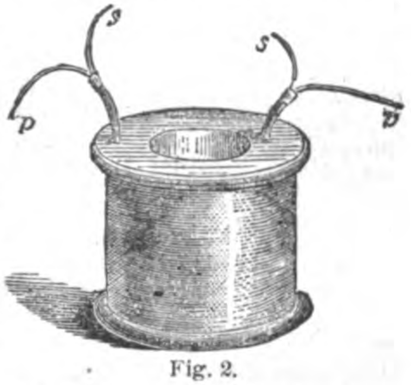


Fig. 2.

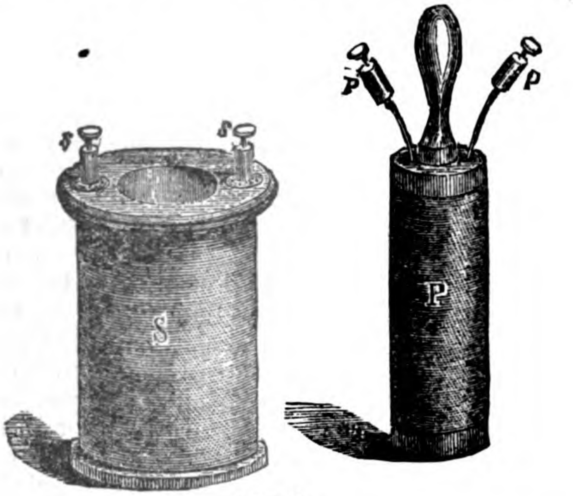


Fig. 3.

mary current be altered; the needle announces the I. of currents according to the principles stated above. In order, however, to obtain the greatest effect from the secondary coil, S, it is necessary, while P remains within it, to have some means of continuously completing and breaking the primary current. A contrivance for this purpose is called a *rheotom*, or *current-break*. A simple rheotom may be made of a common file, by holding one wire from the battery against the end of the file, and running the other along the teeth, the current being stopped each time the wire leaves a tooth. In this way, a rapid series of interruptions is effected, each of which is attended by an inverse and a direct current in the secondary wire. A break of the same description, but more constant, may be made by causing a metal spring to press against the teeth of a metal wheel, both spring and wheel being connected with the battery. As the wheel is turned by a handle, the spring breaks the contact each time it slips from one tooth to another. The most convenient form of break, however, is one which is made self-acting by the action of an electro-magnet, which receives the name of a *magnetic hammer*.

Quantity and Tension of Induced Currents.—Let us place the coil P within S; let P, along with a self-acting rheotom, be put in the circuit of a galvanic cell, and let S be connected with a galvanometer. The interruption in the primary current being effected by the rheotom with great rapidity, the induced inverse and direct currents are sent with corresponding rapidity through the coil of the galvanometer. If this last be of a short and thick wire, so as not to tax the tension of the current transmitted, the induced currents will not deflect the needle; or if they should happen, through the unsteady action of the break, to do so, it only oscillates round its position of rest. This proves that *the quantity of electricity transmitted by the induced inverse and direct currents is the same,* for they each exert the same influence on the needles. But if the coil of the galvanometer consist of a long fine wire, the needle is kept deviated in a direction which argues the action of the direct current. This leads us to conclude that *both currents, though equal in quantity, are unequal in tension, the direct current having the highest tension,* for it has more power to force its way through the fine wire of the galvanometer than the inverse. Other proofs of the same principles may be easily furnished.

The difference of the tension of the two induced currents is accounted for in this way: when a change takes place in the primary current, the quantity of the electricity induced by it in the secondary wire is the same whether this change takes place quickly or slowly; the tension, however, is very different. When the change takes place slowly, the total quantity of electricity in circulation continues to pass as slowly, and there is little in motion at one time; but when the same occurs quickly, it is sent with momentum, so to speak, and the quantity in circulation at one time is as much greater, in comparison with the former case, as the time is shorter. It is this quick dispatch of electricity which constitutes the tension of the current. Now, as it takes some time before the primary current is fully established, the inverse induced current is slow and of low tension; but when the contact is broken, the primary current ceases much more suddenly than it began, and the direct induced current is quick and of high tension. This view of the matter is borne out by experiment, for it is found, that *whatever favors the suddenness of the changes of the primary current, heightens the tension of the currents induced by these changes.* The break, from this circumstance, forms an important element in the construction of all I. apparatus.

The inductive power of the primary coil is immensely increased by placing a bundle of soft iron rods or wires in the centre of it. The magnetism which begins and ceases in these at each passage of the current acts in conjunction with the inducing force of the coil. The centre of the bobbin P (fig. 3) is hollow, to receive a bundle of this kind. The greater part of the inductive action is due to the iron core, and the induced currents got with and without it are not to be compared in point of energy. A solid bar of soft iron also may be used, but with much less advantage, for the induced currents which linger in it after the stoppage of the main current, acting themselves inductively, impair the suddenness with which the current disappears from the primary wire and magnetism from the core. The thin layer of oxide which forms on the rods insulates them sufficiently from one another, and prevents the formation of such currents. It is partly for the same reason that metal tubes cannot be used for bobbins for either primary or secondary coils. If such were used *closed circuits* would be formed in them, the reaction of which would prolong the changes of the primary inducers, and consequently impair the tension of the secondary current. Metal bobbins would not be open to this objection if they had a longitudinal slit, which would make the transverse section a broken ring and circuit.

The excitation of magnetism in the core is the principal aim of the primary coil, and as a strong current is essential to that object, it is made of thick wire and of moderate length. In the secondary coil, the tension of the induced current alone is aimed at, and with this view it is made of wire as thin as can be made, so as to admit of as many turns as possible being brought within the influence of the core and primary coil. The electric conformation of the secondary coil is sometimes looked on in the same light as that of a galvanic battery. The total electro-motive force of the coil is the sum of that of all the turns in it, in the same way that the electro-motive force of the battery is proportionate to the number of cells.

Extra Current.—Not only does a galvanic current induce electricity in a neighboring circuit, but it also acts inductively on itself. When contact is broken in a battery circuit, the galvanic spark is seen: see GALVANISM. When the wire is short, the spark is feeble, but it increases in brilliancy with the length of the circuit, and this becomes particularly observable when the wire is wound round in a coil. This certainly does not arise from the current being strong with the long wire, and weak with the short one, for quite the reverse is the case, as might be shown with the aid of a galvanometer. The real cause of the superior brilliancy of the galvanic spark with the long circuit is to be found in the induction of the primary current on the various parts of itself, exciting, as they are called, *extra currents* in the primary wire. It has been fully attested by experiment, that at the instant *a galvanic current begins and ends, extra currents are induced by the action of the several parts of its circuit upon each other, that at the beginning of the current being inverse and that at the end direct.* As the extra current inverse acts opposite to the main current, it does not appear as a separate current, but only retards the instantaneous passage of the main current. The extra current direct succeeds the main current, and has consequently a separate existence. It is what is generally referred to when the extra current is spoken of. This extra current is of much higher tension than the original current. The effect of the extra current on the direct induced current of the secondary coil is to lessen very decidedly its tension. If a way be made for the extra current, the tension of the induced current falls prodigiously. In a large coil-machine, which gives freely sparks of one or two inches in length, when the two portions of the break are joined by a thin wire, so as to allow the extra current to pass, sparks will not travel between the two poles, however near they are brought. When no such communication exists, a portion of the extra current leaps over between the separating parts of the break, and so far diminishes the intensity of the secondary current. The condenser of the coil-machine, described below, has for its object the absorption or suppression, of the extra current, but the manner in which it effects this is not yet properly explained. The prejudicial effect of the extra current on the induced current is easily understood, when we bear in mind that it prolongs the cessation of the magnetism of the core and of the current in the primary coil, and thus impairing the suddenness of this change, reduces the tension of the induced current.

Induction Coil.—The essential parts of this apparatus have been already described in detail. A primary coil with its core of iron wire, and a secondary coil exterior to, and insulated from a primary coil, form the main portion of the instrument. The primary coil is connected with the poles of a galvanic battery, and in the circuit, a rheotom is introduced, to effect the interruptions of the current essential to its inductive action. The only parts not yet referred to are the condenser and the commutator. The condenser consists of several sheets of tinfoil and oiled silk, laid alternately the one above the other. The first, third, fifth, etc., sheets of tinfoil are connected by strips of the same material; so are the second, fourth, and sixth, etc.; the whole forming a condensing apparatus like a Leyden jar, the odd sheets forming the one coating, and the even sheets the other. Each set of sheets is connected with one of the wires of the primary coil. The condenser is generally placed in the sole of the instrument, and does not meet the eye. The commutator consists of an ivory cylinder covered with conducting plates on two sides, and is so constructed that it can break contact, or transmit the current through the coil in either direction.

An I. coil, as constructed by Ladd of London, is represented in fig. 4. The forms under which the instrument appears are very various, and the one in the figure serves only to show the general requirements in its construction. The two binding-screws, *p* and *n*, are for the battery-wires; C is the commutator. The two coils, W, lie horizontally on the sole of the instrument, S. The secondary coil alone is seen, the primary being within it and out of view. The breaking hammer, being behind the coil, is likewise not shown. The condenser is contained by the box which constitutes the sole, and a conducting connection is established between its coatings and the wires of the primary coil. The terminations of the secondary coil are fixed to the heads of the glass pillars, P, P′, which are furnished with pointed rods capable of universal motion. The excellence of the instrument depends on the proper insulation of the secondary coil. The bobbin must be made of glass, gutta-percha, or (best of all) vulcanite, so as to prevent the induced electricity from reaching the ground by the primary coil. Care must also be taken to insulate the different parts of the secondary coil from each other. If this were not done, the spark which completes the secondary current, instead of taking place at the rods, the place at which it is wanted, would pass within the coil itself. It is necessary, in consequence, to have each layer of the coil insulated from the other, by interposing gutta-percha paper, and cementing it with a hot iron to the sides of the bobbin. The induced current must thus pass through all the turns of the wire, and is prevented from shortening its course by leaping over one or more layers of the coil.

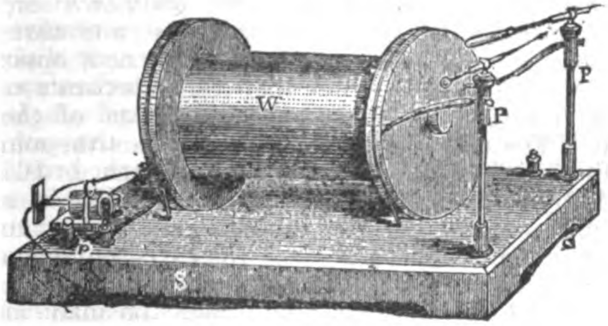


Fig. 4.

Experiments with the Induction Coil.—Suppose that we experiment with a coil like the one shown in fig. 4, about 12 inches long and nearly six inches in diameter, which yields readily sparks of from four to five inches with a battery of six Bunsen cells. After connecting the battery-wires, and setting the commutator so as to complete the contact, let us place the movable rods within an inch of each other. An uninterrupted rush of sparks is transmitted between the points of the rods. The sparks are not the clear single sparks of the electric machine, but seem to be made up of several sparks occurring at the same instant, which are white and crooked. These are enveloped in a luminous haze, which, on closer examination, wears the appearance of a congregation of the spiral sparks, the convolutions of which are in constant rotation. This hazy spark can be blown away by the breath, and separated from the white spark which cannot be so removed. As the rods are withdrawn from each other, it disappears, and when they stand more than three inches apart, the spark resembles in every respect the forked single spark of a powerful electric machine. When the points are withdrawn beyond striking distance, electric brushes still play between them, which become more visible in a darkened room. If the hand be brought near the rod connected with the exterior end of the coil, sharp stinging sparks, two or three inches in length, are got. The rod connected with the inner end does not yield them so readily, and this is the same whether it be the positive or negative pole. When a gold-leaf electroscope is brought near, the leaves part energetically from each other; and when a spark is received by it from one of the rods, it remains permanently charged. When, however, the knob of the electroscope is brought into actual contact with either of the rods, this action ceases, because the induced currents, inverse and direct, neutralize each other. When the knob touches, both currents effect the leaves equally; but when it is at some distance, the direct current alone has tension enough to act. Each pole of the I. coil is the seat of two opposite electricities, alternating with each other, alike in quantity, but differing in tension, and this accounts for the resemblances and differences between the coil and machine electricities. When the poles are put in connection with the coatings of a Leyden jar, sparks passing between the points are much more brilliant, and the sharp snap of the simple spark grows into a loud report. The Leyden jar effects a condensation of the electricity of each direct current, and each spark discharge takes place in shorter time, and consequently with greater intensity. The condensed spark punctures paper and the like with great facility, but it is of very low heating power. The uncondensed spark, more particularly the hazy spark, got when the poles are near each other, kindles paper, gunpowder, coal-gas, and other combustibles with readiness and certainty. It is from this property of its spark that the I. coil is of so great use in mining operations. The two ends of the wires coming from the coil are fixed near each other without touching, and are imbedded in a charge of gunpowder at a safe distance from the operator. The wires are insulated by gutta-percha, and when the induced current is sent through them, sparks pass through the gunpowder between the ends of the wires, and set fire to it. When several charges have to be ignited simultaneously, the spark of the coil-machine is considered much more reliable than the action of a powerful galvanic battery in heating thin wires connecting the ends of the battery-wires: see GALVANISM. The power of the direct induced current of even large I. coils to deflect the magnetic needle, and to effect chemical decomposition, is insignificant. This shows that it is much inferior to the inducing current in quantity, however much it may be superior in tension. The physiological effect, on the other hand, is tremendous, and the experimenter must take care not to allow any part of his body to form the medium of communication between the poles, as the shock so got might be dangerous if not fatal.—See ELECTRICITY: ETC.: also ELECTRICITY, THEORY OF.

When the induced current is made to pass through nearly vacuous spaces, a very splendid effect is produced. The *Electric Egg* (fig. 5) is employed to display this. It consists of a glass vessel in the shape of an egg, with an open neck above, and another below. Brass fittings are attached to these. The lower opening is fitted with a stop-cock, and can be screwed to the plate of an air-pump. A brass rod and ball rise a short way into the egg. The fittings above are intended to allow of a rod ending in a ball passing up and down air-tight, so that the two balls can be conveniently set at different distances. When the egg is exhausted of air, and the wires from the coil are attached, the one above, and the other below, a luminous glow extends between the balls, which is wide in the middle, and contracts at either extremity. When the exhaustion has reached one-twelfth of an inch, as shown by the gauge of the air-pump, black bands are seen to lie horizontally in the light, so as to wear the appearance of stratification, as shown in the figure. These occur more readily when a drop or two of turpentine, alcohol, or ether have been introduced into the egg. The cause of the stratification is as yet a matter of speculation. The ball which forms the negative pole is enveloped in a covering of blue light. The glow, which is of a beautiful mauve tint, appears to proceed from the positive ball, and reaches nearly to the negative ball, from which it is separated by a well-marked non-luminous space. By means of the commutator these appearances at the balls can be instantly transposed. Serving the same purpose as the electric egg, there is a great variety of vacuous tubes hermetically sealed and ready for use at any time. These have been first filled with particular gases, and then exhausted, and they exhibit lights of various tints, according to the gas contained by them.

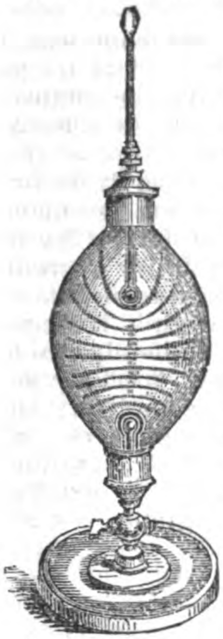


Fig. 5.

INDUCTOPHONE, *ĭn-duk'to-fōn:* an apparatus for illustrating telephonically the laws of induction, originally devised by Willoughby Smith of London, but claimed independently as regards its essentials by Ch. Mailloux of New York. A flat coil of wire is placed in circuit with a contact breaker and a battery. The contact breaker may be a tuning-fork. On transmitting an intermittent current a field of lines of force is established. The inductophone discovery centred in the observation of the fact that a simple piece of iron, such as a disk of ferrotype metal, held at a distance from and facing the coil, would reproduce the sounds. A telephone with its terminals disconnected responds also. If the disk is placed with its edge directed toward the coil, no sound will be emitted. Of course walls and partitions had no effect upon the action. The discovery excited some interest at the time, though it has lost it now on account of the advance in study of induction by ether waves, on which the inductophone depends for its action. It is illustrated and described in *The Engineer* London, vol. liii, pp. 364–386.

INDUE, v. *ĭn-dū'* [L. *indu'ĕrĕ*, to clothe with: Gr. *endŭō*, I put on]: to clothe; to invest; to supply with; in *OE.*, to endow; to furnish. INDU'ING, imp. INDUED' pp. *-dūd':* see ENDUE.

INDULGE, v. *ĭn-dŭlj'* [L. *indulgĕō*, I am courteous, I pamper—from *in*, in or on; *dulcis*, sweet]: to yield to the enjoyment or practice of without constraint or control; to suffer; not to restrain or oppose; to grant as a favor; to humor. INDUL'GING, imp. INDULGED', pp. *-dŭljd'.* INDUL'GENCE, n. *-dŭl'jĕns* [F. *indulgence*—from L. *indulgen'tĭă*]: forbearance of restraint or control; gratification; favor granted; a power claimed by the R Cath. Chh. of granting remission of the penalty due to sin for a certain time, either on earth or in purgatory; or, a remission of temporal punishment due to sin after the guilt has been removed by penance: V. to attach or grant an indulgence to any pious practice. INDUL'GENCED, a. *-jĕnst,* specially authorized. INDUL'GENT, a. *-jĕnt* [F.—L.]: compliant; unduly favorable; yielding to the wishes and desires, etc., of those under one's care. INDUL'GENTLY, ad. *-lĭ.* INDUL'GER, n. *-jėr,* one who.—SYN. of 'indulge': to gratify; favor; humor; cherish; foster; allow; harbor; grant.

INDUL'GENCE, in Roman Catholic Theology: a remission, by church authority, to a repentant sinner, of the *temporal* punishment which remains due after the sin and its eternal punishment have been remitted: A doctrine which has been the subject of so much angry controversy, and which may be regarded as the chief among the proximate causes of the Reformation, deserves very careful consideration. We must confine ourselves, however, to a brief authentic explanation of the doctrine as it is held by Rom. Catholics, together with a history of the practice in the various ages of the church.

By the discipline of the first centuries, a severe course of penitential observance was exacted of all who fell into any grievous crime, especially apostasy, murder, and adultery, such sinners being excluded from church communion for various periods, in some cases even till the hour of death. These penitential observances, which Protestants regard as purely disciplinary, were designed, according to the Rom. Cath. view, as an expiation, on the part of the penitent, for the *temporal* punishment which, after sin and the *eternal* punishment due to it have been remitted by God, still remains to be undergone; and some of the most acrimonious of the early controversies, the Montanist and the Novatian, arose as to the power of the church to relax these penitential observances, and to admit grievous sinners to communion. These ancient relaxations (of which they regard that referred to in I Cor. v. 5 and in II Cor. ii. 10 as a type) are considered by Rom. Catholics as examples of the modern I.; and the practice which grew up in the 3d and 4th c., and which even then was carried to great extremes, of granting such relaxations on the recommendation of martyrs or confessors, is held by Rom. Cath. theologians to be an illustration of that principle of vicarious atonement, according to which, in the theory of indulgences, the church is supposed to supply, from the inexhaustible treasure of the merits of Christ, and of the 'supererogatory' works of the saints, what may be wanting to the completeness of the atonement of the less perfect but yet truly penitent sinner to whom she grants the indulgence. That this practice of relaxation, whatever may have been its real import, was to be used according to the judgment of the bishop as to the disposition of the penitent, is expressly laid down by the Council of Ancyra 308, and by that of Nice 325. In all cases, however, the person granting the relaxation was to impose certain good works as a partial substitute for the penalty which had been relaxed; and among these works, which had at first been purely personal, came by degrees to be included money payments for certain religious or charitable objects, as the building of a church, or the foundation of a monastery or hospital. The name I. appears to have originated late, the first recorded instance of its use being by Alexander II., 11th c.; but the institution itself is found in full development during the wars of the Crusades, the serving, or the contributing to service in which, 'provided it were for devotion alone, and not from motives of greed or of glory,' was accepted in the Council of Clermont 'as an equivalent substitute for all penance.' Such an I. was called 'plenary;' where a portion only of the penitential works was relaxed, it was called 'partial'; and, to put a bar to their excessive multiplication and to other abuses, Innocent III. declared the power of granting 'plenary indulgences' to be reserved to the pope alone, bishops being authorized to grant only the 'partial' or limited indulgences described above. The fourth Lateran council condemns the 'indiscreet and superfluous' granting of indulgences; and among the abuses which grew up in the church during the western schism, one of the most remarkable was the lavish dispensation of indulgences, in the granting of which the contending popes rivalled each other in prodigality. The last extreme, however, was not reached until the beginning of the 16th c., when, with a view to raising the funds necessary for the erection of the great church of St. Peter's at Rome, the pope, Leo X., published a plenary I., the principal condition for the gaining of which was a contribution to this work. Rom. Cath. historians contend that in itself such a condition was perfectly justifiable, and that if duly explained to the people, it might be lawfully and even meritoriously complied with; but they admit that many of the preachers of the I., in extolling its natural effects, went to indefensible extremes, and that, even making the fullest allowance for exaggeration, it cannot be denied that grievous abuses both of doctrine and of practice were committed in Germany and in Switzerland. Hence the decree of the Council of Trent, while it affirms that the use of indulgences, as being 'most salutary for the Christian people, and approved by the authority of councils, is to be retained in the church,' yet orders that, 'in granting them, moderation be observed, lest, by excessive facility, discipline may be enervated.' Upon the special instructions of this council, all the modern legislation on the subject of indulgences has been founded; but as the decree of the council does not explicitly declare what is the precise effect of an I., it is further explained by Pope Pius VI., in his celebrated bull, *Auctorem Fidei*, that an I. received with due dispositions, remits not alone the canonical penance attached to certain crimes in this life, but also the temporal punishment which would await the penitent after death to be endured by him in purgatory.

From the above explanation, it will be gathered that Rom. Catholics do not understand by an I. a remission of sin, much less a permission to commit sin, or a promise of forgiveness of future sin. They contend, moreover, that since the benefit of an I. can be received only by a sinner who has repented of sin, and resolved to embrace a new life, the imputation of introducing laxity of principle and easy self-indulgence is entirely unwarranted. And though, for the most part, the good works which are required as the condition of obtaining indulgences may appear easy and even trivial, yet the one indispensable preliminary—sorrow for sin and sincere purpose of amendment—in itself involves the very highest effort of Christian virtue.

On the subject of indulgences, Protestants are accustomed to quote the language used by popes in granting them, in opposition to the views put forth by Rom. Catholics in defending them. And nothing is more common than for popes in their bulls of jubilee, to grant *the most plenary and complete indulgence, pardon, and remission of all sins,* on certain conditions specified. And though this grant is made only to 'the faithful who are truly penitent and have confessed,' yet being limited to a certain period, as the year of jubilee, and to certain conditions, as saying certain prayers, visiting certain churches, wearing or kissing a scapular, or the like, it is argued that these cannot but acquire, in the estimation of the people, an importance which is very unfavorable to penitence, virtue, faith, and piety. It is likewise urged that the whole doctrine of indulgences is founded not only on an unwarranted assumption of power given to the church, but also on a doctrine of human works and merits inconsistent with what is taught in Scripture as to the office of Christ as the complete, sufficient, and only Savior.

INDULT, n. *ĭn-dŭlt′*, or INDULTO, n. *ĭn-dŭl′tō* [L. *indultus,* indulged]: right to present to certain benefices and dignities, granted by the pope: in *France*, a right of demanding at the filling up of a vacant bishopric or abbey the presentation to the first benefice falling vacant in that bishopric or abbey: in *Spain*, a duty or tax paid.

INDUMENTUM, n. *ĭn′dū-mĕn′tŭm* [L. a garment—from *indŭō*, I put on]: the plumage of birds; in *bot.*, a hairy covering.

INDUPLICATE, a. *ĭn-dū′plĭ-kāt* [*in*, in, and *duplicate:* L. *dūplex*, double]: in *bot.*, applied to the arrangement of a flower-bud in which the edges of the sepals or petals are slightly turned inward. INDU′PLICATIVE, a. *-kā-tĭv*, in *bot.*, applied to a modification of valvate prefloration in which the edges of the petals or sepals are bent in or rolled round.

INDURATE, v. *ĭn′dū-rāt* [L. *indūrātus*, hardened—from *in*, into; *dūrō*, I harden: It. *indurato*]: to make or grow hard; to harden; to make unfeeling. IN′DURATING, imp. IN′DURATED, pp.: ADJ. hardened; made obdurate; in *geol.*, applied to rocks that have been hardened by the action of heat. IN′DURA′TION, n. *-rā′shŭn*, the act of hardening, or process of growing hard.

INDUS: see under INDRA.

INDUS, n. *ĭn′dŭs* [Skr. *Sindhu,* irrigator; probably from a root signifying 'to flow']: great river that bounds Hindustan on the west. It rises in unknown regions in Tibet, near the sources of the kindred Sutlej, lat. 31° 20′ n., and long. 81° 30′ e. The precise spot is said to be 18 000 ft. above sea-level, and on the n. side of the Kailas, a Himalayan peak which overtops it by at least 4,000 ft. Its general course, till it forces its way between the Himalaya Proper and the Hindu Kush, is toward the n.w., being nearly at right angles to its general direction through the plains. On reaching Sussi (near the borders of Budakshan), its most northern point, it turns s., hides among the hills, and reappears at Takot in Kohistan, n. of the Punjab. After a course of 870 m., having still 940 m. before it, it becomes navigable at a point which, for other reasons also, is worthy of notice. Here it receives the Cabul, its principal affluent on the right; and here is Atak (Attock), anciently Taxila, scene of Alexander the Great's passage. About half way from Atak to its mouth, it receives, on the left, the accumulated waters of the Punjab through the single channel of the Punjnud. Each of the 'five watercourses,' as well as the Cabul, is navigable for inland craft to the mountains. Below its confluence with the Punjnud, the I., instead of increasing in volume, becomes gradually less. Its basin is here narrow, so that the affluents are insignificant, while the arid sandy soil causes the river to suffer from absorption and evaporation. This operates still more powerfully from the fact, that the river here divides into numerous channels, many of which never return at all to the main stream, while others return much shrunken in volume. This wasting of the waters is, however, not very apparent to the eye, owing to the gradual slackening of the current and the ascent of the tides. At Migani, eight m. n. of Hyderabad, commences the Delta Proper, which measures 75 m. upward, by 130 along the coast of the Arabian Sea. The area of the drainage—its extreme dimensions being respectively 900 m. and 750—has been estimated at 373,000 sq. m., more than three times the extent of Great Britain and Ireland.

The value of the I. as a route of traffic is less than that of most other streams of equal magnitude. In the winter, one only of its numerous outlets is at all available for communication with the sea; and even after the melting of the spring snows, there is no passage anywhere for an ordinary sea-going vessel of more than 50 tons. Still, in another respect the river is favorable for navigation, as the fall from Atak to the sea is only 2,000 ft. in 940 miles.

The I. abounds with fish of excellent quality, and is infested by crocodiles. The alluvium brought down by the stream has been calculated to be sufficient for an annual formation 42 m. long, 27 m. broad, and 40 ft. deep. Near Rori, a short distance below the first point of divergence, both the main stream and one of its offsets pass through a ridge of limestone, which must at one time have turned the descending floods laterally into what is now a desert, but bearing the plainest traces of former cultivation.

INDUSIA, n. *ĭn-dū'zĭ-ă*, INDU'SIÆ, n. plu. *-zĭ-ē* [L. *indūsĭŭm*, a shirt, a woman's under garment—from *indŭō*, I put on]: the cases or coverings of certain insects. INDU'SIAL, a. *-zĭ-ăl*, composed of or pertaining to petrified indusiæ. INDUSIAL LIMESTONE, remarkable variety of fresh-water limestone found in Auvergne, abounding in the indusiæ or cases of caddis-worms, great heaps of which have been encrusted with carbonate of lime, and formed into a hard travertine. Several beds occur, some as much as six ft. thick, each cubic inch of which contains as many as ten or twelve cases: see CADDICE. The Auvergne cases are formed of the shells of a minute Paludina, so small that 100 shells may be counted in a single indusium. **Indusium**, n. *ĭn-dū′zĭ-ŭm*, a covering or case; in *bot.*, the epidermal covering of the fructification in some ferns; a collection of hairs so united as to form a sort of cup, and which incloses the stigma of a flower.

INDUSTRIAL, a. *ĭn-dŭs′trĭ-ăl* [F. *industrie*, industry—from L. *indus′trĭă*, carefulness, industry: It. *industria*]: relating to industry, or the products of the arts and manufactures. **Indus′trialism**, n. *-ĭzm*, state of society in which all the members co-operate for the common good; opposed to militancy. **Indus′trially**, ad. *-lĭ.* **Indus′trious**, a. *-trĭ-ŭs*, diligent in business or study; assiduous; not remiss. **Indus′triously**, ad. *-lĭ.* **Industry**, n. *ĭn′-dŭs-trĭ*, habitual diligence in any employment or pursuit. **Industrial accession**, phrase borrowed by the Scotch from the Roman law to denote the increased value given to a thing by labor and skill being exercised upon it: this phrase includes the case of a person building by mistake on another's land, in which case, in England, though the building was done *bonâ fide*, it belongs absolutely to the owner of the land, who is not bound even to pay for the materials, which he can keep, or their value; but in Scotland, the owner of the land, thought entitled to the materials, would be liable to pay for their value. **Industrial exhibition**, the public exhibition or display of the various products of a country, or of various countries, the results of labor and skill (see Exhibition, Industrial). **Industrial fruits**, in *Scotch law*, produce of land which the life-renter is entitled to (see Emblements). **Industrial school**, a school in which some of the mechanical arts and useful occupations are taught (see below).—Syn. of 'industry': diligence; assiduousness; assiduity; laboriousness.

INDUS′TRIAL SCHOOLS: term variously applied; sometimes synonymous with ragged schools, in which mechanical arts are taught, sometimes designating ordinary elementary schools, in which agricultural or some other industrial art is taught to the boys during one portion of the schoolday, or in which sewing, cooking, washing, and ironing are taught to the girls. In England, Scotland, and Ireland, attempts have been made to attach practical instruction in agriculture to elementary schools for boys, but with very small success, except in Ireland; there the Glasnevin Agricultural Training School has accomplished much good. In the United States there are many successful institutions of this kind, mostly under church or parochial organizations, but sometimes independent institutions drawing support from the community generally. There are also, of high grade and excellent scientific and literary standing, agricultural colleges, with special tuition in applied science. See Agricultural Education. The attempt to attach other industrial arts to national and parochial schools in Britain, has not had great results. The Privy Council on Education gave special grants for many years to schools which combined industrial with literary instruction, but these grants are not continued in the Revised Code. In elementary schools for girls, industrial work, to the extent of sewing, shaping, knitting, and netting, has been almost universally introduced, and forms one of the most important and interesting features of female primary education in Great Britain; but the attempt to connect with these subjects instruction in cooking, washing, and ironing, has been tried as yet only to a limited extent, and has been only partially successful. In ragged schools, on the other hand, no department of the school-work seems to thrive better, partly because it enters so largely into the scheme of instruction, partly because the children are removed from the control of parents, and left solely to the management of the school committee; for the great obstacle in the way of connecting industrial arts with ordinary schools is the unwillingness of parents to see their children engaged in manual occupations during the time which ought, in their opinion, to be devoted solely to intellectual training and the acquisition of literary knowledge. The ragged schools are recognized by the legislature as 'industrial schools,' to the maintenance of which the treasury may contribute on the representation of the home sec., and may be defined as schools in which the pupils are lodged, fed, and clothed, as well as taught the elements of an ordinary education, and the practice of some trade. By a statute 1866, children under 14 years of age found begging, etc.; children under 12 charged with offenses; refractory children under 14 in charge of parent; and refractory children under 14 in workhouses or pauper schools, may be sent by a magistrate to a certified industrial school. The Education Acts of 1870 and 72, for England and Scotland respectively, provide that the school-board of any parish or borough may establish and maintain industrial schools, but subject to the provisions of the Industrial Schools Act of 1866. In 1875 the number of industrial schools in England and Scotland was 114, containing 11,776 children; in 1880, there were 130 schools, with 15,136 children. See JUVENILE OFFENDERS, SCHOOLS FOR: RAGGED SCHOOLS: EDUCATION, NATIONAL OR STATE.

INDUS'TRIAL SOCI'ETIES: societies which carry on some trade, the profits of which are applied to an object of mutual benefit, resembling the object of Friendly Societies (q.v.). In Great Britain, the 'Industrial and Provident Societies Act, 1876,' regulates these societies on improved principles, the first statute having been passed 1852. Any number of persons not less than seven may establish such a society, for the purpose of carrying on any labor, trade, or handicraft, whether wholesale or retail, or the buying and selling of land, or the business of banking under certain restrictions, and taking deposits only under 5*s.* in one payment, and under £20 from one person. The rules of the society must define the object, name, and place of office of the society, and it must in all cases be registered as one of limited liability. The rules and statute define terms of admission of members, mode of holding meetings, voting, transferability of shares, audit of accounts, investment of capital, mode of withdrawing from society, claims of executors, application of profits, appointment and remuneration of managers and officers, and make provision for the custody, use, and device, of the seal of the society. Rules must be forwarded to the Registrar of Friendly Societies of England and Scotland, for his certificate that they are in conformity with law, before they can be acted upon. No member's interest is to exceed £200, but one society may invest its funds with another or others to any amount. These societies are placed on the same footing as Friendly Societies (q.v.) in respect of the exemption from assessment under income-tax—of settlement of disputes by registrar, justices, or county court—of compensation to members unjustly excluded—of the power of justices or the county courts in case of fraud, and of the jurisdiction of the registrar.

In the United States, such societies are usually known as Co-operative Societies: see CO-OPERATION, IN INDUSTRY OR TRADE (in the United States).

INDUTIVE, a. *ĭn-dū′tĭv* [L. *indūtŭs*, a putting on, clothing—from *indŭō*, I put on]: in *bot.*, applied to seeds which have the usual integumentary covering.

INDUVIÆ, n. plu. *ĭn-dū′vĭ-ē* [L. clothes]: in *bot.*, persistent portions of the perianth; the withered remains of certain leaves which, not being articulated, remain on the stem, and do not fall off and leave a scar. INDU′VIUM, n. *-vĭ-ŭm*, the calyx forming the large membranous, orange-colored pouch of *Physālis* or 'winter cherry.' INDU′VIAL, a. having the form of the calyx or membranous pouch around the fruit of *Physālis.*

INDWELLER, n. *ĭn′dwĕl-lėr* [*in*, in, and *dweller*]: an inhabitant. IN′DWELLING, a. remaining in the heart: N. residence within.

INEBRIATE, v. *ĭn-ē′brĭ-āt* [L. *inēbrĭātus*, made drunk—from *in*, in; *ēbrĭŭs*, drunk]: to make drunk; to disorder the senses; to intoxicate: N. a drunkard. INE′BRIATING, imp. INE′BRIATED, pp. INE′BRIA′TION, n. *-ā′shŭn*, drunkenness. INEBRIETY, n. *ĭn′ĕ-brī′ĭ-tĭ*, intoxication; drunkenness. INEBRIATES, ASYLUM FOR: see DIPSOMANIA.

INEDITED, a. *ĭn-ĕd′ĭ-tĕd* [F. *inédit*, inedited—from L. *inēdĭtus*: *in*, not, and Eng. *edited*]: not edited; unpublished.

INEFFABLE, a. *ĭn-ĕf′fă-bl* [F. *ineffable*—from L. *ineffābĭlĭs*, unutterable—from *in*, not; *effor*, I speak out]: unutterable; incapable of being expressed in words—used only in a good sense. INEF′FABLY, ad. *-blĭ*, in a manner not to be expressed.—SYN. of 'ineffable': unspeakable; inexpressible.

INEFFACEABLE, a. *ĭn′ĕf-fās′ă-bl* [F. *ineffaçable*: *in*, not, and Eng. *effaceable*]: that cannot be destroyed or made invisible. IN′EFFACE′ABLY, ad. *-blĭ*.

INEFFECTIVE, a. *ĭn′ĕf-fĕk′tiv* [*in*, not, and *effective*]: failing to produce any effect, or the effect intended; useless. IN′EFFEC′TIVELY, ad. *-lĭ*. IN′EFFEC′TIVENESS, n.—SYN. of 'ineffective': weak; inefficient; inefficacious; vain; fruitless; abortive.

INEFFECTUAL, a. *ĭn'ĕf-fĕk'tū-ăl* [*in*, not, and *effectual*]: not producing its proper effect; weak; resulting in failure. **IN'EFFEC'TUALLY**, ad. *-lĭ*, in vain. **IN'EFFEC'TUALNESS**, n. *-ăl-nĕs*, want of power to produce the effect desired; inefficacy.

INEFFERVESCENT, a. *ĭn-ĕf'fėr-vĕs'sent* [*in*, not, and *effervescent*]: not effervescing. **INEF'FERVES'CENCE**, n. *-sĕns*, state of not effervescing. **INEF'FERVES'CIBLE**, a. *-sĭ-bl*, not capable of effervescing.

INEFFICACIOUS, a. *ĭn-ĕf'fĭ-kā'shŭs* [*in*, not, and *efficacious:* F. *inefficace*, inefficacious—from L. *inefficācĕm*]: not possessing the power to produce the effect desired; of inadequate power or force. **INEF'FICA'CIOUSLY**, ad. *-lĭ*. **INEF'FICA'CIOUSNESS**, n., or **INEF'FICACY**, n. *-kă-sĭ*, want of sufficient power to produce the effect desired, or the effect expected; failure.

INEFFICIENT, a. *ĭn'ĕf-fĭsh'ĕnt* [*in*, not, and *efficient*]: not possessing the power or qualities desired; not efficacious; not active. **IN'EFFI'CIENTLY**, ad. *-lĭ*. **IN'EFFI'CIENCY**, n. *-ĕn-sĭ*, want of power or qualities to produce the effects desired; inactivity.

INELASTIC, a. *ĭn'ē-lăs'tĭk* [*in*, not, and *elastic*]: not elastic. **IN'ELASTIC'ITY**, n. *-tĭs'ĭ-tĭ*, the want of elastic power.

INELEGANT, a. *ĭn-ĕl'ĕ-gănt* [L. *inel'ĕgans*, or *inelĕgan'tem*, not choice or elegant: *in*, not, and Eng. *elegant*]: wanting beauty or polish, as in language or manners; wanting symmetry or ornament. **INEL'EGANCE**, n. *-găns* [F.—L.], or **INEL'EGANCY**, n. *-găn-sĭ*, want of beauty or polish, as in language or manners. **INEL'EGANTLY**, ad. *-lĭ*, not becomingly; without ornament or polish; coarsely.

INELIGIBLE, a. *ĭn-ĕl'ĭ'jĭ-bl* [*in*, not, and *eligible:* F. *inéligible*]: incapable of being elected to an office from absence of necessary qualifications; not to be chosen. **INEL'IGIBLY**, ad. *-blĭ*. **INEL'IGIBIL'ITY**, n. *-bĭl'ĭ-tĭ*, incapacity of being elected to an office; state or quality of not being worthy to be chosen.

INELOQUENT, a. *ĭn-ĕl'ō-kwĕnt* [*in*, not, and *eloquent*]: not eloquent; wanting in graceful and fluent speech; not persuasive as in written or spoken words.

INEMBRYONATE, a. *ĭn-ĕm'brĭ-ō-nāt* [*in*, not, and *embryo*]: in *bot.*, having neither embryo nor germ.

INENCHYMA, n. *ĭn-ĕng'kĭ-mă* [Gr. *inĕs*, fibres; *engchuma*, what is poured in, juice, tissue]: in *bot.*, cells in which there is a spiral elastic fibre coiled up in the inside, the cells generally consisting of membrane and fibre combined.

INEPT, a. *ĭn-ĕpt'* [F. *inepte*, foolish—from L. *ineptus*, improper—from *in*, not; *aptus*, fit, apt]: unfit; unsuitable; improper; foolish. **INEPT'LY**, ad. *-lĭ*. **INEP'TITUDE**, n. *tĭ-tūd*, unfitness.

INEQUALITY, n. *ĭn'ĕ-kwŏl'ĭ-tĭ* [F. *inequalité: in*, not, and Eng. *equality*]: state of not being equal; unevenness; a part unlike or different from the rest; difference of rank, station, or condition; inadequacy; disparity. In *Algebra*, the expression of a species of relation existing between two numbers when they are unequal, one being greater than the other. The relationship is expressed by the sign $>$ or $<$ placed between the two quantities or between their symbols. The larger quantity or its symbol is placed upon the open side; thus $a > b$ indicates that a is greater than b, while $b < a$ is read b is less than a. The sign is complementary to the sign of equality $=$. It is placed both right- and left-handed as shown, and its shape gives it a pictorial significance, the larger side belonging to the larger quantity.

INEQUILATERAL, a. *ĭn-ē'kwĭ-lăt'ėr-ăl* [*in*, not, and *equilateral*]: having the two sides unequal, as in the case of the shells of the ordinary bivalves; not having the convolutions of the shells lying in the same plane, but obliquely wound round an axis, as in some Foraminifera.

INEQUITABLE, a. *ĭn-ĕk'wĭ-tă-bl* [*in*, not, and *equitable*]: not equitable; not just.

INEQUIVALVE, a. *ĭn-ē'kwĭ-vălv* [*in*, not, and *equivalve*]: composed of two unequal pieces or valves.

INERADICABLE, a. *ĭn'ĕ-răd'ĭ kă-bl* [*in*, not, and *eradicable*]: that cannot be rooted up or destroyed.

INERMIS, a. *ĭn-ėr'mĭs* [L. *inermis*, unarmed]: in *bot.*, unarmed; without prickles or thorns.

INERT, a. *ĭn-ėrt'* [F. *inerte*—from L. *inertem*, without skill, slothful; *inertĭă*, inactivity, laziness: It. *inerte*, inert]: without the power of moving itself, or of active resistance to motion impressed; slow to act; disinclined to act; sluggish. **INERT'LY**, ad. *-lĭ*, sluggishly; dully. **INERT'NESS**, n. want of activity; sluggishness. **INER'TIA**, n. *-ėr'shĭ-ă* [L.]: in *med.*, the sluggish action of some organ or part; that inherent quality of passiveness, or of indifference to a state of rest or of motion, in bodies which preserves them in perpetual rest when undisturbed, or in perpetual motion unless stopped by some resisting force.—The part of this principle involving continuance in rest if undisturbed was known to the ancients, and by them attributed to a certain repugnance to motion, which was a characteristic of all matter; but it was shown by Galileo that the latter part was equally true and general. This property of matter has been called by Kepler *vis inertiæ*.—SYN. of 'inert': dull, passive; inactive; lazy; slothful; indisposed; powerless.

INESCUTCH'EON, in Heraldry: single shield borne as a charge. When there are two or more, they are called escutcheons; for an I., it is said, must always occupy the fess point of the shield. An I. is distinguished from an escutcheon of pretense, which is not a charge, but a separate coat.

IN ESSE, *ĭn ĕs'sĕ* [L. *in*, in; *esse*, to be]: in being; actually existing. **IN POSSE**, *ĭn pŏs'sĕ*, [L. *in*, not; *possĕ*, to be able]: denoting that a thing is not, but may be; probable, though not yet having any real existence.

INESTIMABLE, a. *ĭn-ĕs′tĭ-mă-bl* [F. *inestimable*—from L. *inestĭmābĭlĭs: in*, not, and Eng. *estimable*]: not able to be estimated or computed; being beyond all price; invaluable; incalculable. INES′TIMABLY, ad. *-blĭ.*

INEVITABLE, a. *ĭn-ĕv′ĭ-tă-bl* [F. *inévitable*—from L. *inevitābĭlĭs*, unavoidable—from *evītārĕ*, to shun, to avoid—from *e*, out of; *vītārĕ*, to shun]: that cannot be avoided or escaped from. INEV′ITABLY, ad. *-blĭ.* INEV′ITABLENESS, n. *-bl-nĕs*, or INEV′ITABIL′ITY, n. *-bĭl′ĭ-tĭ*, certainty to happen; impossibility to be avoided.

INEXACT, a. *ĭn′ĕgz-ăkt′* [F. *inexact: in*, not, and Eng. *exact*]: not quite correct or true. IN′EXACT′NESS, n. incorrectness.

INEXCITABLE, a. *ĭn′ĕk-sī′tă-bl* [*in*, not, and *excitable*]: not capable of being roused into action; dull; lifeless.

INEXCUSABLE, a. *ĭn′ĕks-kū′ză-bl* [F. *inexcusable*—from mid. L. *inexcūsābĭlĭs: in*, not, and Eng. *excusable*]: not to be excused or justified. IN′EXCU′SABLY, ad. *-blĭ.* IN′EXCU′SABLENESS, n. *-bl-nĕs.*

INEXHAUSTED, a. *ĭn′ĕgz-hawst′ĕd* [L. *inexhaus′tus*, inexhausted: *in*, not, and Eng. *exhausted*]: not spent or emptied; not having wholly lost all strength or resources. IN′EXHAUST′IBLE, a. *-ĭ-bl*, unfailing. IN′EXHAUST′IBLY, ad. *-blĭ.* IN′EXHAUST′IBLENESS, n. *-bl-nĕs*, or IN′EXHAUSTIBIL′ITY, n. *-bĭl′ĭ-tĭ*, state of being inexhaustible. IN′EXHAUS′TIVE, a. *-haws′tĭv*, not to be exhausted or spent.

INEXORABLE, a. *ĭn-ĕks′ŏ-ră-bl* [F. *inexorable*—from L. *inexorābĭlĭs*, unyielding—from *in*, not; *ex*, out of; *ōrō*, I plead]: that cannot be moved by entreaty or prayer; inflexible; unyielding. INEX′ORABLY, ad. *-blĭ.* INEX′ORABLENESS, n. *-bl-nĕs*, or INEX′ORABIL′ITY, n. *-bĭl′ĭ-tĭ*, the quality of being inflexible.—SYN. of 'inexorable': implacable; unrelenting; relentless; determined; unchangeable.

INEXPEDIENT, a. *ĭn′ĕks-pē′dĭ-ĕnt* [*in*, not, and *expedient*]: not tending to promote a purpose; unfit; unsuitable to time and place. IN′EXPE′DIENCE, n. *-dĭ-ĕns*, or IN′EXPE′DIENCY, n *-ĕn-sĭ*, want of fitness; impropriety; unsuitableness to time or place. IN′EXPE′DIENTLY, ad. *-lĭ.*

INEXPENSIVE, a. *ĭn′ĕks-pĕn′sĭv* [*in*, not, and *expensive*]: not costly.

INEXPERIENCE, n. *ĭn′ĕks pē′rĭ-ĕns* [F. *inexpérience: in*, not, and Eng. *experience*]: want of knowledge derived from observation and trial. IN′EXPE′RIENCED, a. *-ĕnst.*

INEXPERT, a. *ĭn′ĕks-pért′* [*in*, not, and *expert*]: not skilled; wanting in that knowledge or dexterity which is derived from practice. IN′EXPERT′NESS, n. want of expertness.

INEXPIABLE, a. *ĭn-ĕks′pĭ-ă-bl* [F. *inexpiable*—from L. *inexpĭābĭlĭs*, that cannot be atoned for—from *in*, not; *expĭō*, I make atonement for]: admitting of no atonement or satisfaction; that cannot be appeased. INEX′PIABLY, ad. *-blĭ.*

INEXPLICABLE, a. *ĭn-ĕks'plĭ-kă-bl* [F. *inexplicable*—from L. *inexplĭcābĭlis*, that cannot be unfolded—from *in*, not; *explĭcō*, I unfold]: incapable of being explained or interpreted; that cannot be rendered intelligible. **INEX'PLICABLY**, ad. *-blĭ*. **INEX'PLICABLENESS**, n. *-bl-nĕs*, or **INEX'PLICABIL'ITY**, n. *-bĭl'ĭ-tĭ*, state of being inexplicable.

INEXPLICIT, a. *ĭn'ĕks-plĭs'ĭt* [L. *inexplĭcĭtus*, unexplained, obscure; *in*, not, and Eng. *explicit*]: not clear in statement.

INEXPLORABLE, a. *ĭn'ĕks-plō'ră-bl* [*in*, not, and *explorable*]: that cannot be searched out or discovered.

INEXPRESSIBLE, a. *ĭn'ĕks-prĕs'sĭ-bl* [*in*, not, and *expressible*]: not to be expressed in words; unspeakable; indescribable. **IN'EXPRES'SIBLY**, ad. *-blĭ*, in a manner or degree not to be told in words.—SYN. of 'inexpressible': ineffable; unutterable; untold.

INEXPRESSIVE, a. *ĭn'ĕks-prĕs'sĭv* [*in*, not, and *expressive*]: not tending to represent or show; not emphatic. **IN'EXPRES'SIVENESS**, n. *-sĭv-nĕs*.

IN EXTENSO, *ĭn ĕk-stĕn'sō* [L. *in*, into; *extensus*, spread out, extended]: in the extended form; at full length; without abridgment.

INEXTINCT, a. *ĭn'ĕks-tĭngkt'* [*in*, not, and *extinct*]: not put out; not quenched.

INEXTINGUISHABLE, a. *ĭn'ĕks-tĭng'gwĭsh-ă-bl* [F. *inextinguible*—from mid L. *inextin'guĭbĭlĭs*: *in*, not, and Eng. *extinguishable*]: that cannot be quenched or destroyed; that cannot be put an end to.

IN EXTREMIS, phrase, *ĭn ĕks-trēm'ĭs* [L.]: in the last state or stage, whether of life, safety, or resources.

INEXTRICABLE, a *ĭn-ĕks'trĭ-kă-bl* [F. *inextricable*—from L. *inextricābĭlis*, that cannot be disentangled—from *in*, not; *extrīcō*, I disentangle]: that cannot be freed or disentangled. **INEX'TRICABLY**, ad. *-blĭ*. **INEX'TRICABLENESS**, n. *-bl-nĕs*.

IN'EZ DE CAS'TRO: see CASTRO, INEZ DE.

INFALLIBIL'ITY OF THE CHURCH: in controversial theology, the immunity from error—and in the strict and full sense of the term, entire exemption from liability to err (inability to err)—in all that regards faith and morals, which is claimed by the Rom. Cath. Church, and, at least as regards the past, by the Greek Church as represented in the decrees of the councils which that church accepts as ecumenical. The claim of the Greek Church, however, which does not go beyond that of *inerrancy*, or actual exemption from error till the present time, differs widely from that of I. put forward by the Roman Church, which involves not alone an actual historical immunity from error, but also such a positive and abiding presence of the Spirit of God as will at all times both protect against the possibility of error, and guide and direct in the faithful teaching of all necessary truth. The I. claimed by the Roman Church is thus of two kinds, *passive* and *active*—the first (Matt. xvi. 18), in virtue of which the church never can *receive* or *embrace* any erroneous doctrine, no matter by whom proposed; the second, in virtue of which she is charged with the function (Matt. xxviii. 19; xvi. 15; Ephes. iv. 11–16) of permanently *teaching* to the world the essential truths of God, of actively resisting every access of error, and of authoritatively deciding every controversy by which the oneness of belief among the faithful may be endangered. Rom. Catholics regard this gift as a natural and necessary accompaniment of the authority in matters of faith with which they believe the church to be invested, and which, if not guided in its exercise by such infallible assistance, would be but a false light, and an attractive but dangerous instrument of delusion.

Regarding this claim, two important and practical questions arise, both of which have occasioned much controversy among Rom. Catholics themselves, viz., as to the *subject*, that is, the seat or the organ of this I,; and as to the *object*, that is, the matters to which it extends.

As to the first, all Rom. Catholics have been agreed that the body of bishops, morally speaking, throughout the church, acting in common with the pope, constitute the most perfect organ of the I. of the church; hence, that when they unite in any way, whether as assembled in a general council or separated in place, their judgment is infallible. Thus, if a doctrinal decree be addressed officially by the pope to the whole church, and be either expressly confirmed or tacitly accepted by the bishops, this decree was held infallible. In like manner, if a doctrinal decree, emanating even from a local council, as that of a national, or even of a provincial church, should be universally accepted by the pope and the bps., that decree also was held to be infallible. In a word, wherever there is found the *united* judgment of the pope and the bishops, all agreed in accepting it as the infallible judgment of the church. But should the pope alone judge without the bishops, then arose the well-known dispute of the Gallican and ultramontane divines; the latter affirming, the former denying, the I. of the papal judgment; but all agreeing that it was not binding *as an article of Catholic faith*, so long as it had not received the assent of the body of the bishops. By the decree of the Vatican Council (1870), this controversy has been decided; and it is now agreed that the doctrinal decrees of the pope teaching *ex cathedrâ* are to be accepted as possessing the same I. which attaches to the teaching of the church: see COUNCIL, OR SYNOD.

On the matters or subjects to which the gift of I. extends, Rom. Catholics are agreed in one principle, that it embraces all those subjects, and those only necessary for maintenance of divine truth in the church. Hence, presupposing divine revelation, either written or oral, it embraces all questions of faith and morality, all subjects of general discipline, so far at least as to preclude the introduction, by authority of the church, of any discipline which should be injurious to faith or to morality. On the other hand, it does not embrace questions of science, or matters of fact, or abstract opinions unconnected with religion. On this point all Rom. Catholics have been agreed. But a very celebrated dispute arose in the 17th c., on occasion of the *Augustinus* of Jansenius, as to the infallibility of the church in judging of books, out of which originated the well-known Jansenist distinction of *law* and of *fact*: see JANSENISM. On this it is enough to say, that all Rom. Catholics are now agreed in recognizing as a necessary condition to the effective I., that it should extend to the judgments on books so far as to decide whether the doctrine contained therein may or may not be opposed to sound faith or morality.

The arguments in favor of the I. of the church, which Rom. Catholics derive from texts of Scripture, are set aside by Protestants on the ground that these teach only the permanence of the church and the continuance of God's grace toward it (as Matt. xvi. 18; Matt. xxviii. 19, 20; etc.), and have no relation whatever to the special subject of infallibility. Moreover, it is said that whatever may be the I. conferred on '*the Church*' in Holy Scripture, it cannot be claimed by a hierarchy or priesthood, but must belong to the congregation (ekklesia) or assembly of disciples, whether locally or generally gathered; and that as an ecumenical assembly of all disciples is in the nature of the case impossible, the I. promised must be for guidance of the local company 'gathered together in Christ's name,' in their dealing with difficult duties as such duties may arise. Compare Matt. xviii. 17, with 19, 20; and with Mk. x. 42, 43: also see ECCLESIA.—It is common also for Protestants to urge that on the supposition of I. and of the need of an infallible interpreter of Scripture, as commonly declared by Rom. Catholics, there can be no value in any argument from Scripture; and that the Roman Catholic theologian, in attempting to prove at once the I. of the church by Scripture, and the authority of Scripture by the I. of the church, is involved in the sophism of reasoning in a circle. —On the Prot. side it is sometimes added, that if God's word needs an interpreter to make it a safe rule of faith, man's word may well be supposed equally difficult to comprehend.—And the notion of I., with the whole system of which it forms an essential part, is protested against as contrary to the rational nature of man, and to that personal relation and responsibility to God on the part of each soul which are at the foundation of all true religion. Something is made in argument also of the difficulty which the advocates of the I. of the church have found in agreeing as to where it is lodged. But to this the Rom. Catholic retorts that equal or greater difficulties attach to the Prot. statements concerning the infallibility of the Bible (q.v.).

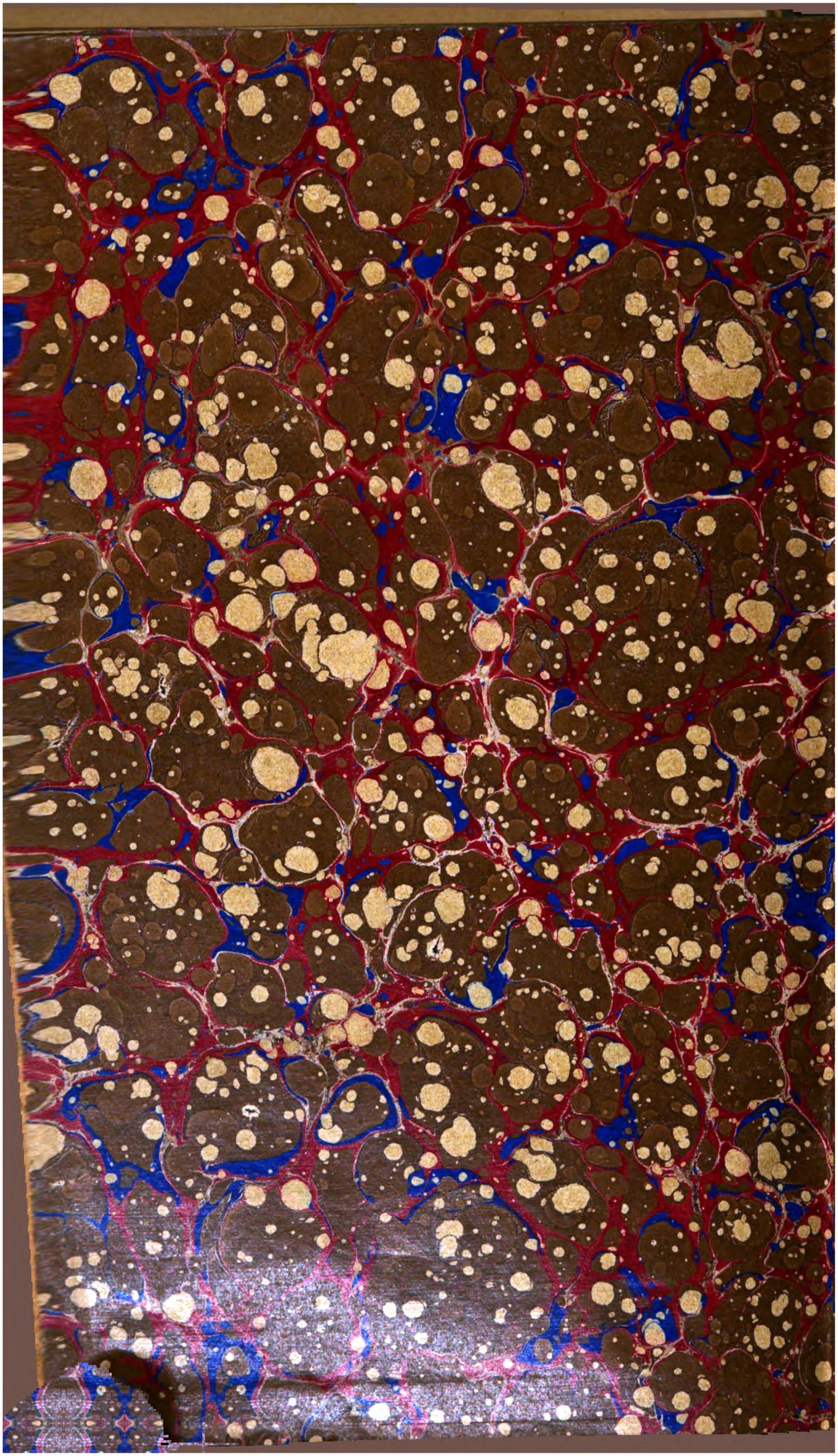
INFALLIBLE, a. *ĭn-făl'lĭ-bl* [*in*, not, and *fallible:* It. *infallible:* F. *infaillible*]: that cannot err or be deceived; certain. INFAL'LIBLY, ad. *-blĭ.* INFAL'LIBIL'ITY, n. *-bĭl'ĭ-tĭ* [F. *infallibilité*], or INFAL'LIBLENESS, n. *-bl-nĕs*, entire exemption from liability to error. **INFALLIBILITY OF THE BIBLE** (see INSPIRATION OF THE BIBLE). **INFALLIBILITY OF THE CHURCH**, see below.

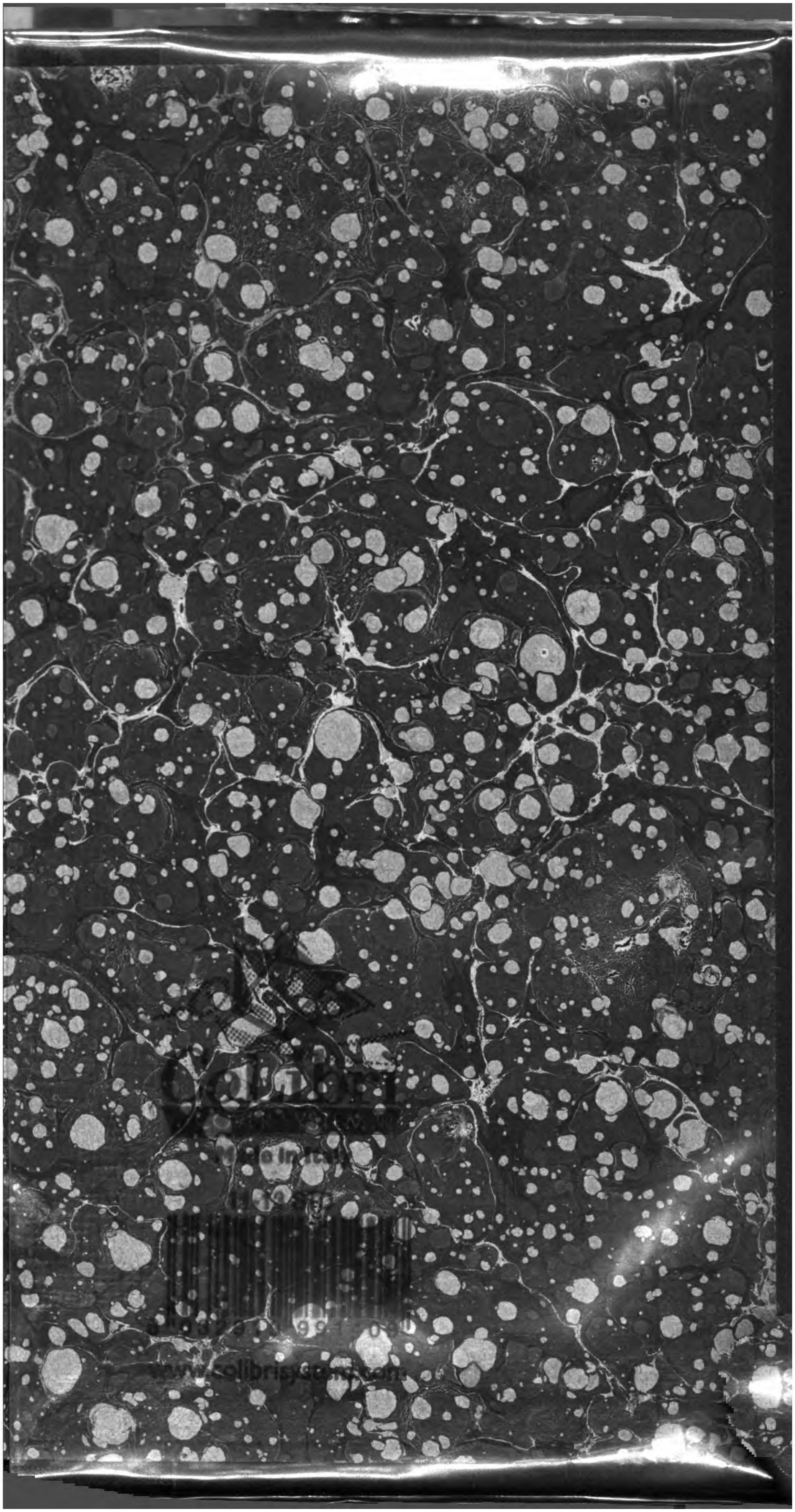
INFAMED′, or **DEFAMED′**, in Heraldry: epithet applied to a lion or other animal which has lost its tail, the loss being supposed to disgrace or defame it. *Defamed looking backward* occurs in ancient blazon for counter-rampant regardant, the lion being supposed to be fleeing from an enemy.

INFAMOUS, a. *ĭn′fă-mŭs* [L. *infāmĭs*, ill spoken of—from *in*, not; *fāmă*, fame: It. *infame;* F. *infâme*, infamous]: having a reputation notoriously vile; base; odious; detestable. IN′FAMOUSLY, ad. *-lĭ*. INFAMY, n. *ĭn′fă-mĭ* [F. *infamie* —from L. *infāmĭa*]: public disgrace; extreme baseness or vileness; qualities which are detested and despised. IN′FAMOUS WITNESS, witness to whose name infamy attached; formerly rejected in the courts of Great Britain, but now allowed to give evidence subject to comment, and to state what he can say for what it is worth. IN′FAMOUS BEHAVIOR—DISCHARGE WITH INFAMY, terms in use in the military and naval codes to designate conduct (and its penalty) not only opposed to discipline, but also disgraceful in a social sense. In all countries, the following have always been classed as infamous behavior: desertion of colors on the field of battle, failure to attempt to succor comrades in danger, cold blooded cruelty, and other crimes greatly subversive of morality. If a man be found guilty of any of these crimes by a court-martial, and not sentenced to death, the sentence is ordinarily discharge—or dismissal—with ignominy or infamy. So severe an enactment adds to the force of the penalty, and stigmatizes the offender for life as a disgrace to his country.—SYN. of ‘infamous’: odious; disgraceful; ignominious; detestable; scandalous; shameful; base; vile.

INFANCY, n. *ĭn′făn-sĭ* [F. *infant*—from Sp. *infante*, an infant; F. *enfant*, a child—from L. *infans* or *infan′tem*, very young, little: F. *enfance*, infancy—from L. *infantĭă*, childhood]: the first part of life; the first age of anything; early period; in *law*, state of being a minor. INFANT, n. *ĭn′fănt*, a babe; a child; in *law*, a person under 21 years. ADJ. tender; young; immature. INFANT-LIKE, like an infant. INFANTE, n. *ĭn-făn′tā*, in *Spain* and *Portugal*, any son of the king except the eldest; any daughter except the eldest is styled the INFAN′TA, n. *-tă*. Since the 14th c., the heir-apparent to the throne in Spain has been styled Prince of Asturias, and the heir-apparent in Portugal, until the separation of Brazil from the mother-country, bore the title Prince of Brazil. The personal domain of an Infante or Infanta is called the *Infantado*, and this has come to be the name of a district which was made a dukedom 1475. INFANTILE, a. *ĭn′făn-tīl* [OF.—L.]: of or relating to an infant; young; childish. IN′FANTINE, a. *-tīn* [OF. *infantin*]: pertaining to young children.

END OF VOLUME XIX.





Colibri

Made in Italy

www.colibrisystem.com

UNIVERSITY OF ILLINOIS-URBANA
3 0112 045768832